Universität für Bodenkultur Wien

Urban pop-up housing environments and their potential as local innovation systems

Compendium of international temporary housing examples

October 2019

(marginally extended till September 2021,

slightly adapted in November 2021)

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PREFACE

As part of the interdisciplinary research project "Urban pop-up housing environments and their potential as local innovation systems", six deliverables (D1 – D6) were generated in accordance with the project proposal, which reflect in detail the working process and outputs of the diverse tasks in the working packages. An overview of all deliverables and their key messages is provided in the Executive Summary (Deliverable D0). Different SCI publications were also generated within the work-packages and based on the deliverables.

The present document provides a compendium of diverse temporary housing examples, which were collected mainly during the first and a half project year (2018 – 2019) as the basis for further research activities within this project, and this data collection was part of working package 1. This project data base was extended by including few further examples till September 2021. That means, the actuality of the collected pop-up housing examples is perhaps not up to date anymore.

DISCLAIMER:

This document contains links to external third-party websites over whose content we had and have no influence. Therefore, we cannot take over any responsibility for these external contents. The respective provider or operator of the pages is always responsible for the content of the linked pages.

Moreover, contents of the individual housing examples may no longer be current since the access for research was carried out in the period 2018 – 2019, with view updates till September 2021. Thus, some of the links provided in this data base may have already expired.

The descriptions of the housing examples were taken from diverse web-based and published sources. The editors of this data pool have collected and processed the information to the best of their knowledge and understanding, however, the validity of information contained in this data pool cannot fully be guaranteed, and it cannot be guaranteed that the information and intention by the original authors were fully presented.

INTRODUCTION

Cities are increasingly facing the difficult task of providing their residents with a high-quality living environment while at the same time responding to the increasing demand for housing in a sustainable urban environment. Temporary housing solutions represent one possible approach to quickly increase residential densification by adapting areas often not considered in conventional residential housing. However, this is currently a little investigated and discussed topic in strategic urban development.

In this interdisciplinary research project, framework conditions and specific concepts for sustainable temporary housing solutions were developed and analysed as a basis for integration into future urban planning strategies. Such temporary solutions should be able to be easily and quickly implemented into temporarily unused spaces of an urban environment. In addition, they should be of high quality and largely oriented towards the requirements of ecological and social sustainability and be affordable. The research in this project consequently focused on the three elements: people, area, and housing type.

This document presents the results of a comprehensive literature research on international temporary housing examples from which a data pool of more than 100 examples was generated. Subsequently, basic characteristics and principles regarding the three research elements were derived. Relevant data on temporary housing examples was collected in so-called “info-sheets”. These temporary housing examples could range from conceptual works to prototypes and examples with real-life implementation. The aim was to achieve a high diversity of different temporary housing options. Based on this, specific user profiles for temporary housing needs were created, area and housing types were systematised and these were put into context in the form of six scenarios for the city of Vienna.

It has to be clearly emphasised at this point that the collection **is not a list of "best practice examples".** While some examples have worked very well and have been accepted by the respective residents, there are also a number of examples that were not fundamentally "designed" as particularly people-friendly living environments or have not developed that way. However, these were intentionally not excluded, as one can particularly learn from failed examples what needs to be done better in the future.

A detailed description of the data collection process and further research steps and outcomes can be found in Deliverable D1, which is available at the project website https://popupenvironments.boku.ac.at.

DATA COLLECTION PROCESS AND DESCRIPTION OF TEMPORARY HOUSING EXAMPLES

Relevant data on temporary housing examples was collected in a structured documentation sheet ('info-sheet') covering the following information categories:

- **Basic information** such as the particularities of the case or status of implementation
- **User information** such as social mix and social cohesion or gender-sensitive aspects
- **Location and unit features**, such as coordinates, sea level, construction, and foundation type, used materials, number of storeys, building type, connection to neighbouring buildings or houses, number of residential units, number of persons per unit, area of plot, square meters per person, equipment and facilities and the integration of recreational or productive opportunities in design
- **Information on water supply, sanitation, energy supply and solid waste management**
- **Information on the implementation and life cycle** of the case, including information on the funding structures, the contracting authorities, cost of construction, related patents, the use of recycled materials in construction, the reversibility, the expected total lifetime, and adaptability

The main collection phase spanned from the beginning of May 2018 – October 2019. Few additional examples were later added to the database.

The following sources were used during the collection process:

- peer-reviewed literature
- grey literature
- websites dedicated to the case (architects, NGOs, companies…)
- articles on webpages dedicated to fields such as architecture or sustainability research
- personal recollection
- newsletter articles or TV reports
- on-site visits

Typically, various sources were required for each case in order to collect sufficient data.

If necessary, GoogleEarth, Open Street Map and other applications were used to retrieve location specific information (e.g., about the surroundings, orientation), and at times to manually count the individual units on a pop-up environment (PUE). The GoogleEarth feature "Historical satellite Imagery" was sometimes useful to retrace beginning and end points of PUEs as well as changes and adaptions during their lifespans. YouTube videos and Facebook profiles/groups provided additional insight that was not available on formal websites (e.g., a video of the constructing process gives information on the foundation and a Facebook group of the residents gives insights on their everyday life).

It was important to cover the examples as comprehensively as possible. However, justified assumptions were allowed, for example if there was no explicit mention of a sewer connection, but due to the structure and integration into the urban fabric it could be assumed that there was no other possibility in a given case or context. It was not possible to visit the majority of the included examples to carry out detailed site visits to verify all assumptions due to time and

cost constraints. In some cases, however, this was indeed possible, and in cases of doubt, contact was sometimes sought with architects or operators.

However, it was not possible to obtain information on all examples in the same consistent quality. Therefore, the examples in this compendium are divided into different groups:

- **Group A:** Comprehensive data (often from multiple sources) available in all above-mentioned categories, including detailed location data; examples were actually inhabited in real life situations at least at one point in time
- **Group B:** Solid data situation, but data gaps exist in at least one of the above-mentioned categories
- **Group C:** Prototypes, examples in the development stage (which have not (yet) been inhabited under real living conditions), and examples with innovative detail aspects relevant to at least one project focal point (e.g. resource use, social interaction)
- **Group D:** Permanent housing solutions with important learning effects for temporary forms of housing or temporary (pre-)use that has taken place
- **Group E:** Further examples (e.g. without detailed information on all above-mentioned categories or temporary housing examples that have already been included in other groups but were used in a different location)

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INTERNATIONAL TEMPORARY HOUSING EXAMPLES – GROUP A

For the following examples, comprehensive data (often from multiple sources) is available in all above-mentioned categories, including detailed location data; examples were actually inhabited in real life situations at least at one point in time

1. SHED

Project website:

https://loweguardians.com/shed/

Image 1: David Jensen, http://studiobark.co.uk/projects/the-shed-project/

Image 2: David Jensen, http://studiobark.co.uk/projects/the-shed-project/

Project description:

“We’ve teamed up with Studio Bark to create the SHED, a revolutionary and environmentally friendly solution for quality and affordable accommodation in vacant buildings.”

“The SHED will provide a safe, sustainable alternative for workers seeking short-term accommodation, but could be vital in the future in helping alleviate homelessness and the refugee crisis.”

“What’s special about the SHED is that it is an environmentally friendly, self-contained solution for each individual guardian. What’s more, the SHED only takes one day to build and dismantle – all you need is a mallet and a drill! It minimises waste because it can be taken down and rebuilt in a different site. The SHED is constructed from affordable, low-impact materials with a mixture of Oriented Strand Board (OSB), lamb’s wool insulation and a small amount of recycled polyester. All materials are made in the UK. Despite being a flexible product, the SHED is made of long-lasting, durable materials. The SHED is all about self-build and it can be decorated or changed by guardians that are passionate about the space they occupy. We also want our guardians to get involved in building their own space (with our help of course) and take ownership of their living quarters. We also have the unique opportunity of build a new community of SHED builders. Many of our guardians live fast-paced, transient lifestyles. In some ways, this makes it even more important that at the end of a busy day, they have a private space that is entirely personal to them. Our guardians want to have an impact on the space they live and the bespoke nature of the shed allows them to do that.”

Particularities of the Project:

- sustainable materials
- local materials (on national level)
- assembly in 1 day
- disassembly and reuse possible
- temporary housing units for inside vacant buildings
- Minimization of waste during construction through Computer Numeric Cutting (CNC) of the OSB according to Studio Bark's U-Build module system

User specific aspects	
User groups:	○ locals ○ primarily "London's young professionals, creatives and key workers" ○ future possibilities for homeless and refugees mentioned
Drivers/triggers:	rental growth since 2008 financial crisis led to pursuit of affordable and sustainable accommodation. Protection of vacant buildings from squatters and vandals
Social mix & cohesion:	Seems to be geared towards millennials. Possible uses for homeless and refugees are explicitly mentioned on the website.
Location and environment	
Location:	London, UK (but could be installed anywhere) 51.5072 -0.1275 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal setting
Climate:	Temperate
Sea level:	35 m
Physical properties	
Site type:	developed site
Plot area:	20 m²

Construction type:	modular, prefabricated building
Building type:	container inside vacant building
Foundation type:	no foundation; stands on wheels inside a vacant building
Weather resistance:	none
Connection to neighboring buildings:	multiple containers can stand within the same room of a vacant building
Materials used:	○ formaldehyde free Oriented Strand Board (OSB) ○ lamb's wool insulation ○ small amount of recycled polyester (polycarbonate) ○ wood
No. of buildings:	1+ unit in 1 building
No. of residential units:	1+
Storey count:	1
No. of persons per unit:	1
Integration of recreational and/or productive opportunities:	Assumption: depends on building opportunities
Utilities	
Water supply:	dependence on building infrastructure
Sanitation system:	dependence on building infrastructure
Electricity:	dependence on building infrastructure
HVAC:	lamb's wool insulation. otherwise assumed to be dependent on building infrastructure.
Solid waste management:	dependence on building infrastructure
Implementation data	
Implemented?	Yes

Designer:	Studio Bark Projects in collaboration with Anna Glover / Lowe Guardians
Client:	Lowe Guardians
Executing company:	The Shed Project / Lowe Guardians
Funding:	Developed by a start-up. Inhabitants rent.
PUE-related patents:	
Life cycle aspects	
Reversibility:	Yes, completely reversible
Planned reuse/recycling:	Disassembly, reassembly and reuse are planned for the units.
Potential/planned secondary use concepts for TH-units:	potential use for homeless and refugees
Adaptability:	described as modular
Innovation aspects:	already inhabited by workers seeking short-term accommodation, see https://loweguardians.com/meet-first-occupant-shed-project/ or https://loweguardians.com/lowe-guardianswork-experience-ezra/

Image 3: David Jensen, http://studiobark.co.uk/projects/the-shed-project/

2. PASSIVE HOUSE POP-UP

Project website:

http://www.archilovers.com/projects/119960/pop-up-house-the-affordable-passive-house.html

Image 4: http://www.archilovers.com/projects/119960/pop-up-house-the-affordable-passive-house.html

Image 5: http://www.archilovers.com/projects/119960/pop-up-house-the-affordable-passive-house.html

Project description:

Multipod Studio have patented a unique approach to passive construction that delivers outstanding thermal insulation at an affordable cost. No special tools required, the house is assembled using lightweight and recyclable materials for quick installation. The materials used are inexpensive, so the cost remains unbeatable, and the thermal envelope created means no additional heating is necessary. The first prototype of this new type of passive house, has bloomed in the pine valleys of the South of France. Low cost, recyclable and passive, the Pop-Up House has all of the qualities of tomorrow's homes.

Particularities of the Project:

Designed to be used as a low-cost home or office. It's 100% removable and recyclable. Built in just 4 days with a group of workers, keeping labour costs at an absolute minimum.

User specific aspects	
User groups:	Families, students, workers
Drivers/triggers:	Fast realization for a very good and affordable result.
Location and environment	
Location:	Avenue Louis Philibert, 13290 Aix-en- Provence, France 43.490806 5.335583 [Show on map]

Surrounding environment:	Rural environment
Climate:	Temperate
Physical properties	
Site type:	Green field
Plot area:	165 m²
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Foundation type:	Wood boards (laminated veneer lumber) resting on micro-piles (concrete) put in the ground. (see details: https://www.popup-house.com/en/what-type-of-foundations-can-be-used/)
Equipment & facilities:	○ main kitchen/dining room/living room (60 m²) ○ back kitchen (7 m²) ○ wc (2 m²) ○ bathroom (4 m²) ○ master bedroom (13 m²) ○ wc (2 m²) ○ bathroom (6 m²) ○ office (10 m²) ○ bedroom (11 m²) ○ bedroom (11 m²) ○ terrace (35 m²)
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ Wood boards (foundation) ○ concrete (foundation) ○ Insulated blocks + wood frame + screw assembly (floor) ○ Light Expanded polystyrene (EPS) block + wood frame (walls) ○ Recycled polystyrene + wood (cladding)
No. of buildings:	1
No. of residential units:	1
No. of persons per unit:	4-6

Built area:	130 m²
Area per person:	about 30-35 m²
Implementation data	
Implemented?	Yes
Year of construction:	2014
Designer:	Multipod studio, in particular: Corentin Thiercelin, Fleur Chretien, Olivier Berg
Executing company:	Multipod studio
Cost of construction:	Insulating structure: 200 €/m²
Life cycle aspects	
Reversibility:	All the materials can be reused and are recyclable.
Use of reused/recycled materials during construction:	Cladding made by recycled polystyrene.

3. HEIJMANS ONE

Project website:

https://www.heijmans.nl/en/heijmans-one/

Image 6: https://www.heijmans.nl/en/heijmans-one/

Image 7: https://www.heijmans.nl/en/heijmans-one/

Project description:

Dutch real estate developer Heijmans designed the Heijmans ONE as a movable one-bedroom house that can be easily set up on a vacant space and moved as easily when needed. The Heijmans ONE is designed specifically as affordable pop-up housing that can be put up in temporarily vacant lands. The movable house includes a bedroom, kitchen, bathroom, living room, and a patio. The Heijmans ONE is the company's solution to two issues: the need for temporary rental houses and the existence of empty derelict lots.

Particularities of the Project:

This special home offers opportunities to meet demands for qualitative and affordable rental housing, while at the same time solving a social issue. Heijmans ONE intelligently combines two issues: a shortage of good temporary rental houses and the dreary sight of empty areas. Heijmans ONE is a beautiful and complete home that is placed temporarily in empty urban areas. It has all the necessary facilities, such as a kitchen, bathroom, large living room with an open space, a separate bedroom and its own front door with an outside patio.

User specific aspects	
User groups:	○ between 25 and 35 years old ○ first job ○ singles
Location and environment	
Location:	Zeeburgereiland, Amsterdam, Netherlands 52.3712 4.9711 [Show on map]

Surrounding environment:	Urban environment
Climate:	Temperate
Physical properties	
Plot area:	about 35 m²
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Foundation type:	Concrete piles on whom the house is put on.
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Wood
No. of residential units:	1
Storey count:	2
No. of persons per unit:	4
Built area:	about 35 m²
Area per person:	8.75 m²
Implementation data	
Implemented?	Yes
Year of construction:	2014
Designer:	Heijmans ONE
Executing company:	Heijmans ONE
Comments & references	
Additional comments:	Built in only 1 day; accessed via private foot path; entrance on the front

4. HABITAT FOR HUMANITY, HAITI

Project website:

http://www.recoveryplatform.org/assets/publication/100917_transitional_to_what_openarchitecture.pdf

Image 8: https://habitat-worldmap.org/es/

Image 9: http://www.recoveryplatform.org/assets/publication/100917_transitional_to_what_openarchitecture.pdf

Project description:

post-disaster free-standing houses with a wooden structure; very basic but can be upgraded with foundation, water and electricity connection, additional living space

Particularities of the Project:

can be modified to be (semi) permanent

User specific aspects	
User groups:	people affected by the earthquake in January 2010
Drivers/triggers:	natural disaster
Location and environment	
Location:	Léogâne, Haiti, exact address unknown
Climate:	Tropical
Sea level:	around sea level (20-30m)

Physical properties	
Construction type:	wood frame
Building type:	house (1-2 units per building)
Foundation type:	point foundation: Concrete Bucket Footings, can be changed into a full concrete foundation
Weather resistance:	
Equipment & facilities:	covered porch
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood and tarpaulin (walls), corrugated steel (roof), small amount of concrete for foundation
Storey count:	1
Built area:	12 m²
Utilities	
Water supply:	it doesn't look like as if it would be connected to water supply system; optionally, a Water Catchment Gutter (50 gallons Storage Barrel) can be added
Sanitation system:	no facilities; Detached Pit Latrine & Shower Stall w/ Plywood Enclosure can be added
Electricity:	unknown which energy supply is used; optionally: Power Control Box, 2 Surface Mount Light Fixtures, 2 Duplex Outlets can be added
Implementation data	
Implemented?	Habitats for Humanity
Year of construction:	Probably 2010
Designer:	Habitats for Humanity
Funding:	Habitats for Humanity

Life cycle aspects	
Expected time of PUE on-site:	3 years
Expected total life time:	can be transformed into permanent housing by adding expansions and upgrading water and energy supplies
Planned reuse/recycling:	possible (re)use as permanent housing
Potential/planned secondary use concepts for TH-units:	unknown; possible reuse of materials in other housings
Use of reused/recycled materials during construction:	source says that relocation or material re-use is possible
Adaptability:	modifications of living space: 1. lumber, fasteners, point foundation (€500); 2. 6,5 m² wood framed shed (€800); 3. sanitary facility, water catchment, power control box, etc.

5. CITÉ A DOCKS

Project website:

https://inhabitat.com/cite-a-docks-100-dorm-rooms-made-from-shipping-containers/

Image 10: https://inhabitat.com/cite-a-docks-100-dorm-rooms-made-from-shipping-containers/

Image 11: http://www.contemporist.com/cite-a-docks-student-housing-by-cattani-architects/

Project description:

student residency built out of old shipping containers

Particularities of the Project:

100 living units for students are created from old, reused shipping containers

User specific aspects	
User groups:	students
Location and environment	
Location:	Résidence A Docks, 37 Rue des Chargeurs Réunis, 76600 Le Havre, France 49.4829 0.1383 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal setting
Climate:	Temperate
Sea level:	16 m

Physical properties	
Site type:	Assumption: brown field; in harbor area
Construction type:	Prefabricated: Containers with metal grid
Building type:	building (more than 2 units per building)
Foundation type:	not specified; probably concrete
Connection to neighboring buildings:	detached (free standing)
Materials used:	shipping containers, insulation: concrete fire walls and rubber
No. of buildings:	17 towers form 2 developments (can be seen as 17 free enclosed buildings or 2 free-standing buildings)
No. of residential units:	100
Storey count:	4
No. of persons per unit:	1
Area per person:	24 m²
Utilities	
Water supply:	connected to centralised water supply system (e.g., municipal water works)
Sanitation system:	connected to centralised wastewater system (sewer)
Electricity:	unknown; assumption: supplied by municipal network
HVAC:	unknown; assumption: supplied by municipal network
Solid waste management:	unknown; assumption: supplied by municipal network
Implementation data	
Implemented?	Yes
Year of construction:	2010

Designer:	Cattani Architects
Executing company:	
Funding:	Unknown; units for rent for 372,00€ (http://www.crous-rouen.fr/logement/residence-a-docks/)
Life cycle aspects	
Reversibility:	deconstruction on grid, removal of containers; foundation not specified
Use of reused/recycled materials during construction:	old shipping containers
Adaptability:	not specified (assumption: no expansions possible)
Comments & references	
Additional references:	http://www.contemporist.com/cite-a-docks-student-housing-by-cattani-architects/

6. CITY CONTAINER, ZÜRICH

Project website:

http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/staedtische-container-zuerich-ch

Image 12: Maurice K. Grünig

Image 13: Martin Zeller, http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/staedtische-container-zuerich-ch

Project description:

Container settlement is built out of two multi-storey buildings. Their distribution creates an inner courtyard. Each unit consists of 4 to 5 containers that share the kitchen and bathroom. If 2 persons share a room, there can be hosted up to 10 persons in one unit. The users are asylum seekers.

Particularities of the Project:

short building period: 2 months; multistorey building built out of containers

User specific aspects	
User groups:	114 asylum seekers
Drivers/triggers:	demand of accommodation for asylum seekers
Social mix & cohesion:	only asylum seekers in the dwelling
Location and environment	
Location:	Leutschenbachstrasse 72, 8050 Zürich, Switzerland 47.4168 8.5575 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Sea level:	430 m
Physical properties	
Site type:	industrial area (Heineken warehouse)
Plot area:	5000 m2
Construction type:	prefabricated containers
Building type:	building (more than 2 units per building)
Foundation type:	not specified, estimated: concrete
Equipment & facilities:	○ unit: kitchen, bathroom for 8-10 people ○ PUE: arcade pathway, inner courtyard, laundromat
Connection to neighboring buildings:	detached (free standing)
Materials used:	containers, metal structure
No. of buildings:	2
No. of residential units:	12
Storey count:	3
No. of persons per unit:	up to 10
Area per person:	15,5 m2
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: connected to municipal network

Solid waste management:	Assumption: connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	NRS in situ
Client:	Asylorganisation Zürich (AOZ), City of Zürich
Executing company:	JägerPartner AG, Zürich
Cost of construction:	€ 6.300.000 (assumed that financed by public)
Life cycle aspects	
Expected time of PUE on-site:	temporary but not specified; 14.12.2020: pictures on google earth show that the THE has been deconstructed
Reversibility:	removal of containers
Planned reuse/recycling:	possible reuse in another place
Potential/planned secondary use concepts for TH-units:	residential use at another site
Use of reused/recycled materials during construction:	Containers
Adaptability:	there have been plans of extending the PUE to give living space to 36 more persons
Comments & references	
Additional references:	https://www.maps.stadt-zuerich.ch/ (zoning plan)

7. SOFORTPROGRAMM LEICHTBAUHALLEN, MÜNCHEN

Project website:

http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank

Image 14:
http://www.proholz.at/architektur/detail/fluechtlingsunterkunft-in-muenchen/

Image 15:
http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank

Project description:

Emergency shelter made from 3 light weight halls for 230 asylum seekers

Particularities of the Project:

Fast construction/removal

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	high demand of accommodation for refugees
Social mix & cohesion:	in the accommodation only asylum seekers
Location and environment	
Location:	Max-Proebstl-Straße, 81929 München, Germany 48.1549 11.6516 [Show on map]
Surrounding environment:	Rural environment; close to agricultural fields but also close to residential area; zoning plan: residential area
Type of setting:	Formal

Climate:	Continental
Sea level:	517 m
Physical properties	
Site type:	green field
Construction type:	similar to tent
Building type:	buildings: 3 tents (halls)
Foundation type:	Assumption: none, built on concrete area
Weather resistance:	
Equipment & facilities:	dining hall 10x20m; inner courtyard
Connection to neighboring buildings:	detached (free standing)
Materials used:	light weight halls, containers; interior: wooden bunks
No. of buildings:	3 tents (halls) and 42 containers: 10 used as offices, 15 as sanitary infrastructure and doctors office, 17 as storage, 1 for technical equipment, 1 for the electrical transformer and one for storag'e of fuel oil
Storey count:	1
No. of persons per unit:	2, 4 or 5
Built area:	1800 m²
Area per person:	9 m²
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: connected to public network
HVAC:	heating with fuel oil; Goal: minimum heat insulation demand according to standard DIN 4108-02

Solid waste management:	Assumption: connected to public network
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	Jan Schabert (günther & schabert Architekten), München
Client:	Project lead: City of Munich (Landeshauptstadt München, Komunalreferal, Baureferat Hochbau)
Executing company:	○ Tents/halls: Eschenbach Zeltbau; ○ Containers: IQ-box, Filippi, Finsterwalder; ○ Interior: Zimmerei Höfle, Die Huber-Schreiber
Funding:	Public
Life cycle aspects	
Expected time of PUE on-site:	2 years
Reversibility:	containers and tents can be removed easily
Planned reuse/recycling:	most of the materials can be reused
Adaptability:	little; residents could choose color of curtain when they moved in

8. WOHNWAGON

Project website:

https://www.wohnwagon.at/

Image 16: Marlene Mautner, https://www.biorama.eu/zu-besuch-im-wohnwagon/

Project description:

A caravan home, that is designed for autarchy: It combines modern biotechnology with old knowledge. It contains an ecosan toilet, photovoltaics, etc. High-quality natural, local materials are used and it is designed ”to invite nature into your home” by including for example a terrace and big windows.

According to the homepage, one potential field of application is for vacancies and temporary use (“Erschließung von Leerständen & Zwischennutzungen”). The Wohnwagon comes in different sizes and with different features and is adaptable to customer’s requirements (including also a do-it-yourself option, where only the empty caravan and building services are purchased). It follows a “less is more” philosophy (in terms of material belongings) and offers a non-mainstream option for better quality of life, by focusing on life in and with nature, sustainable building services, autarchy. Self-reduction is seen as luxury, reduction is not considered a sacrifice, but gaining more freedom. “Reduce to the max”.

Particularities of the Project:

Mobile tiny house (caravan), which offers self-sufficient (autarch) living space with high sustainability standards. It is designed to live inside for a long period of time, however, as it is movable, it still can be considered a temporary house (as the area is potentially used only temporary) High quality of life is a guiding principle of Wohnwagon. Thought out solutions to make best use of limited space within Wohnwagon.

User specific aspects

User groups:	not specified, however everyone can be a customer who is willing to buy a Wohnwagon; thus: people who identify with the philosophy and concept of Wohnwagon
Drivers/triggers:	commercial - The company “Wohnwagon” developed a caravan-based tiny housing solution because they expect to address a market niche (satisfying a previously unmet demand), offering a high-quality, sustainable, movable housing option
Location and environment	
Location:	mobile option, thus not applicable. So far, the company’s target areas are Austria, Germany, Switzerland. A “test-living caravan” is located here: Steinapiesting 13, 2770 Gutenstein. Others are located in Traismauer/Wagram and Berlin. 47.8926 15.8518 [Show on map]
Type of setting:	Formal
Climate:	Temperate
Sea level:	approx. 542 m
Physical properties	
Site type:	As a mobile solution, the site type has to be determined on a case-by-case basis.
Construction type:	custom built production; key data: ○ interior height: 240 cm ○ total height (incl. chassis): 362 cm ○ thickness of wall: 14cm ○ weight (depending on design features): 4-10 tons.
Building type:	house (1-2 units per building)
Foundation type:	none, as it is a caravan with wheels
Weather resistance:	
Equipment & facilities:	○ bathroom: shower, toilet, sink ○ kitchen: (dishwasher, stove, woodfired oven) ○ living room, bedroom ○ Terrace

	○ photovoltaics remote system combined with large accumulator (Speicher) ○ central heating system (solar-wood) for space heating and hot water supply ○ ecosan toilet ○ water circulation system with green sewage treatment plant
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ caravan: local wood (larch, spruce), loam rendering ○ chassis: metal construction ○ insulation: sheep's wool
No. of buildings:	1
No. of residential units:	1
Storey count:	1
No. of persons per unit:	Standard design: 1-2 persons. In special cases there is the option to include a sofa bed for a third person.
Built area:	small: 15m², medium: 25m², large (extendable oriel): 31,5m²
Area per person:	2 persons: 7,5-15,7m², 1 person: 15-31,5m²
Integration of recreational and/or productive opportunities:	One key principle of the concept is living close to nature. As this pop-up unit is moveable, it allows being close to different recreational and productive opportunities
Utilities	
Water supply:	Autarchy is a key principle in Wohnwagon. However, it is also possible to connect the Popup unit to centralised grid, as it might be a legal requirement in some cases. Wohnwagon offers different options for water supply. In general, a reuse system of grey water (shower, sink) by plant-based purification system on the caravan's roof is installed (using hardy plants suited for phytoremediation). Wohnwagon offers 3 increments: 1. external drinking water + plant based-purification system for grey water, collection of purified grey water for e.g., irrigation 2. plant based purification system + pond: purified water is stored in a pond in a natural way and can be pumped into the caravan (where it is treated by a water purification filter)

	3. closed water cycle with high performance filter: No need for a pond, high-performance filter ensures drinking-water quality.
Sanitation system:	Autarchy is a key principle in Wohnwagon. However, it is also possible to connect the Pop-up unit to centralised grid, as it might be a legal requirement in some cases. If not connected to centralized sewer, Wohnwagon offers a waterless, source-separating ecosan toilet (separation of feces and urine) with addition of terra preta (by company Sonnenerde: vegetable carbon, stone powder and organic fibre). The objectives of this system are closed nutrient loops and production of high quality compost.
Electricity:	rooftop photovoltaic system (10 high performance panels): total capacity: 3 kWp. Thus, theWohnwagon living concepts requires a conscious approach of energy. If need be, the caravan can be charged externally (power grid or emergency generator) Electric power is stored in the batteries (integrated in the double bottom floor of the pop-up unit. Key data: o 10 pc. 300 Wp Modules o total capacity: 3 kWp o 3.000 Watt power inverter (Alternative: 5.000 Watt with extension option: wind turbine) o battery system in double bottom floor (260Ah battery, 4 days) o smart operation: different energy-modes depending on weather, usage, charge level o optional: compatible with small wind turbine (roof installation or garden installation)
HVAC:	central heating based on solar power and wood: core element is a combined system with 2 hot water boiler (80L each) and 2 buffer tanks for thermal heat (120L each). The buffer tanks are heated by surplus of PV system. If this is insufficient, additional heating is possible by using the wood-fired oven that is suited for hot water preparation. The buffer tank gives off heat via radiators to interior air and via heat exchanger to showering water. Key data: o 2x 120L buffer tanks (with high quality insulation) o 2 radiators (living room, bathroom) o oven capacity: 8--10kW (wood consumption: approx. 2 solid cubic meters per year (heating and hot water) o 2x 80L boiler o heating time: 2-3h
Solid waste management:	not specified. However, Ecosan toilet requires a compost system for complete sanitising of faecal matter.

Implementation data	
Implemented?	Yes. Until 2016, 12 units of Wohnwagon were sold, mainly in Austria and Germany.
Year of construction:	Starting from 2014
Designer:	Wohnwagon, (Initial idea of Wohnwagon concept by Christian Frantal)
Client:	private persons
Executing company:	Wohnwagon
Cost of construction:	Retail prices range between 54.000-130.000€, depending on degree of autarchy and furnishing and built-in facilities and features.
Funding:	The Wohnwagon is sold to private customers, thus they have to come up with the money somehow. The company Wohnwagon is a startup company which acquired lots of its initial capital in 2 successful crowd-funding campaigns and by winning various awards
Plot ownership:	As a mobile solution, the site type has to be determined on a case-by-case basis. Assumption: mainly private property
Life cycle aspects	
Expected time of PUE on-site:	case-specific (mobile solution can easily be transported to different location)
Expected total life time:	not specified; Assumption: several decades
Reversibility:	yes. As a mobile option, it is reversible.
Planned reuse/recycling:	Natural materials are used to build the Wohnwagon houses. Thus, at the end of its lifetime, the materials can be discarded without high impact on the environment.
Use of reused/recycled materials during construction:	no, but materials used are locally produced and natural to minimise footprint of housing option.
Adaptability:	Size of house is pre-determined (caravan).

	If there is need for more living space, Wohnwagon also offers permanent ”minihaus” solutions, which operate with the same sustainability and autarchy concepts, but are not caravans, thus not temporary. The potential uses of Wohnwagon caravans are vast: second home in the countryside which can later be transformed into a retirement home, hotel room (e.g., in Lower Austria), restaurant, seminar room, yoga studio, forest kindergarten.
Innovation aspects:	One main objective of the concept is bringing more autarchy into the city, allowing for example to grow vegetables and to keep animals and generate electric power not on the countryside, but in the city.
Comments & references	
Additional comments:	picture gallery available at https://www.wohnwagon.at/der-wohnwagon/bilder-galerie/

9. NYC EMERGENCY HOUSING PROTOTYPE

Project website:

http://www.garrisonarchitects.com/projects/oem-housing-prototype

Image 17: Andrew Rugge/archphoto; Josef Samuel Photography

Image 18: Andrew Rugge/archphoto; Josef Samuel Photography

Project description:

Modular post-disaster housing prototype for urban residents who are displaced in the event of a disaster.

Particularities of the Project:

The modular pop-up housing is designed to be flexible and can be set up in public spaces, vacant lots, and yards. The units can be deployed in different parts of the country and easily installed onsite. The modules come in one-to-three-bedroom configurations and include a living area, kitchen, bathroom, and storage space. The modules are also made of recyclable materials and built to be sustainable.

User specific aspects	
User groups:	People affected by disasters

Location and environment	
Location:	40 Sands St, Brooklyn, NY 11201, USA 40.6997 -73.9893 [Show on map]
Surrounding environment:	Urban environment
Climate:	Temperate
Physical properties	
Site type:	Developed field
Construction type:	Prefabricated building
Building type:	building (more than 2 units per building)
Foundation type:	Reinforced concrete foundations
Equipment & facilities:	The modules are infinitely flexible: they can be deployed in vacant lots, private yards, or public spaces. When needed, the modules are trucked to a site, craned into place, and plugged into utilities. With 1- and 3- bedroom configurations, every unit features a living area, bathroom, fully equipped kitchen and storage space. Units are built with completely recyclable materials, cork floors, zero formaldehyde, a double-insulated shell, and floor-to-ceiling balcony entry doors with integrated shading to lower solar-heat gain, provide larger windows, and add more habitable space. Units can be equipped with photovoltaic panels, which will not only alleviate pressure on the city grid, but also ensure the units are self-sustaining.
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Prefabricated curtain walls and panels
Storey count:	3
Utilities	
Electricity:	Units can be equipped with photovoltaic panels, which will not only alleviate pressure on the city grid, but also ensure the units are self-sustaining.

Implementation data	
Implemented?	Yes
Year of construction:	2014
Designer:	Garrison Architects
Client:	NYC Office of Emergency Management
Funding:	State funded
Plot ownership:	NYC Office of Emergency Management
Life cycle aspects	
Use of reused/recycled materials during construction:	Units are built with completely recyclable materials, cork floors, zero formaldehyde, a double-insulated shell, and floor-to-ceiling balcony entry doors.
Adaptability:	The multi-story, multi-family units can be deployed in less than 15 hours, in various arrangements calibrated for challenging urban conditions.
Innovation aspects:	The aim is to create a blueprint for post-disaster housing by utilizing the latest construction technology in conjunction with stringent requirements for safety, sustainability, durability, and universal design. The modules are infinitely flexible: they can be deployed in vacant lots, private yards, or public spaces. When needed, the modules are trucked to a site, craned into place, and plugged into utilities.

10. CONCRETE SHELTER, AHRWEILER

Image 19: OPTERRA, Sven-Erik Tornow, http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/betonshelter-ahrweiler

Image 20: http://www.faz.net/aktuell/gesellschaft/bonner-ingenieur-peter-goergen-hat-neuartige-haeuser-aus-beton-als-fluechtlingsunterkuenfte-entwickelt-13904468.html

Project description:

300 dwellers are hosted in 30 duplexes that are designed to be built abroad but thanks to insulation and heating are suitable for Germany too. The duplexes are made of 6 concrete modules put together on site. The modules of one unit weigh 22 tons; they can be moved by a crane even when built already. The original project name in German is ”Betonshelter Ahrweiler”.

Particularities of the Project:

single family concrete duplexes, low density

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	high demand of accommodation for asylum seekers
Location and environment	
Location:	53474 Bad Neuenahr-Ahrweiler, Germany 50.5255 7.1043 [Show on map]
Surrounding environment:	Rural environment
Type of setting:	Formal

Climate:	Temperate
Sea level:	240 m
Physical properties	
Site type:	green field
Construction type:	Prefabricated building
Foundation type:	concrete floor
Building type:	house (1-2 units per building)
Equipment & facilities:	heating, electric supply
Connection to neighboring buildings:	duplex (one side linked to another house/building)
Materials used:	Concrete
No. of buildings:	30
No. of residential units:	60
Storey count:	1
No. of persons per unit:	5 (4)
Area per person:	3,5 m² or less! (13,5 m²/unit)
Utilities	
Water supply:	There are separate sanitary houses, so it is assumed that there is no water supply in the houses
Sanitation system:	There are separate sanitary houses, so it is estimated that there is no wastewater supply in the houses
Electricity:	connected to local network
HVAC:	infrared radiant heating on the sealing
Solid waste management:	Assumption: connected to local network

Implementation data	
Implemented?	Yes
Year of construction:	2016
Designer:	Peter Görgen
Client:	Land Rheinland-Pfalz
Executing company:	Hachmeister, Andernach
Cost of construction:	€ 10.000-15.000 per unit
Funding:	publicly funded
Plot ownership:	land owned by Akademie für Krisenmanagement, Notfallplanung und Zivilschutz (AKNZ)
PUE-related patents:	not patented because Peter Görgen doesn't want to make money out of his design
Life cycle aspects	
Expected total life time:	not specified but apparently the units have been removed already after 2017
Planned reuse/recycling:	the concrete modules can be reused
Use of reused/recycled materials during construction:	Assumption: none
Adaptability:	units can be used for living or other use: sanitary unit, etc.
Repurpose, reuse, new development of site/building:	planned that units can be reused for hosting low income families (Source: Making Heimat), but the units have been removed apparently after 2017 (Source: Generalanzeiger)
Comments & references	
Additional references:	http://www.faz.net/ http://www.general-anzeiger-bonn.de https://www.opterra-crh.com/

11. CUBITY_ENERGY PLUS AND MODULAR STUDENT LIVING

Project website:

https://cubity.de/cubity/

Image 21: Thomas Ott, http://www.holzbauaustria.at/

Image 22: https://www.dbz.de/artikel/dbz_Vom_Cubity_zum_Living_Lab_LEhttp_www.solardecathlon.tu-darmstadt.de_2062734.html

Project description:

“The guiding principle of the selected design “Village in a House” considered the privacy needs of each individual but reduced private space to a minimum in order to place a focus on common activities. There should be space to exchange opinions, to share cultural life and to make the community a lived reality. The selected project title, CUBITY, is made up of a combination of the words cube, city and unit, and is emblematic for this idea.”

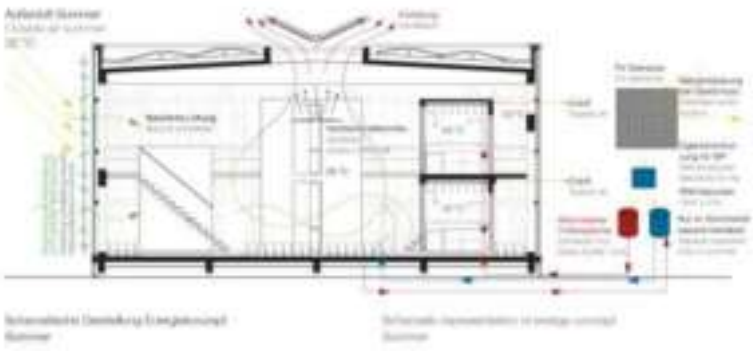
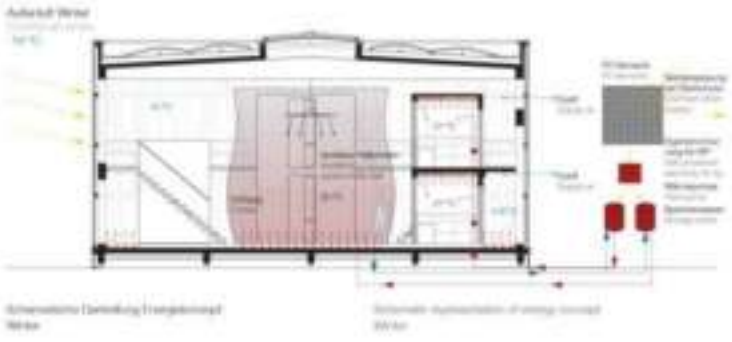
Particularities of the Project:

small rooms on 2 floors in a 16x16 m² cube; plus energy

User specific aspects	
User groups:	students (refugees and locals)
Drivers/triggers:	competition: Solar Decathlon Europe at Versailles
Social mix & cohesion:	students from different countries
Location and environment	
Location:	Versailles, France and later at Melibocusstraße 64-86, 60528 Frankfurt am Main, Germany

	50.0818 8.6392 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	130 m
Physical properties	
Site type:	exhibition ground and later at Frankfurt-Niederrad in Frankfurt am Main
Construction type:	Rigid frame (wood)
Equipment & facilities:	sanitary facilities in each unit; shared space: kitchen, gallery, bike parking, garden, terrace
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood, polycarbonate elements
No. of buildings:	1
No. of residential units:	12
Storey count:	2
No. of persons per unit:	1
Built area:	256 m²
Area per person:	7,5 m² private space, 25 m² public space/person
Integration of recreational and/or productive opportunities:	urban garden (Source: Making Heimat)
Utilities	
Water supply:	connected to centralised water supply system

Sanitation system:	connected to centralised wastewater system
Electricity:	Electricity is the only energy source in CUBITY. The building-integrated photovoltaic modules on the roof annually produce about the amount of energy necessary to cover building operation and user demands. Through the avoidance of local emissions, a nearly climate-neutral building status could be achieved. The design according to the PlusEnergy standard also requires the consistent reduction of electricity demands through the use of energy- efficient appliances. The roof area is equipped with seventy-eight polycrystalline photovoltaic modules offering a nominal output of 19.89 kWp. The regenerative yield is primarily used in the building for temperature control and domestic use. Only surpluses are fed into the public power grid. Load management, which synchronizes energy use and generation as much as possible, ensures a maximum use of self-produced electricity. In addition, thermal storage systems can store converted solar energy, in order to further increase the portion of energy demand covered by solar. Conceptually, the annual yield from photovoltaic electricity should achieve a regenerative output which covers the electricity needed to run the building, including the power needs of the users. With a performance of 19.89 kWp, about 21,200 kWh are generated on the roof of the building annually. The photovoltaic modules, which have been installed in an east-west orientation, feed the electricity that they produce directly into the building's internal grid. All of the building systems, including the heat pump, the electric domestic hot water supply, and the demand-based mechanical ventilation systems, are designed and laid out for direct consumption. When both the demand and production of electricity occur simultaneously, these systems are supplied with renewable energy which is generated on-site. Sixty-five percent of the building's total electricity demand supplies the building, of which forty-four percent goes towards the hot water supply. In addition, the photovoltaic electricity can be used to cover user and equipment needs, for example in the kitchen and the living cubes; these uses make up for about thirty-five percent of the total energy consumption. An estimate for shared electricity, including basic and exterior lighting, is additionally considered in the balance. In order to meet the PlusEnergy standard, the energy produced needs to exceed the demands for both final and primary energy. In the annual balance, the regenerative surplus exceeded the final energy demand by 1.5 percent and the primary energy demand by nearly eighteen percent. Thus, the defined PlusEnergy standard requirements could be fulfilled.
HVAC:	Differing comfort levels have been approved for spatial conditioning in CUBITY. The individual adjustment of room temperatures within the conventional norm range is only possible in the living cubes. The kitchen and the central area are also conventionally heated and, in the summer, cooled

	through the activation of thermal mass. The zone between the living cubes and the outer fa¸cade has the widest range of possible room temperatures. The central common space, the kitchen, and the entryway are heated and cooled through floor-integrated surface systems. The floor provides the largest amount of thermal mass in the building. When the regenerative electricity yield is high enough to power the heat pump through self-produced electricity, the thermal masses can be heated or cooled with a reversible air-to-water heat pump. The thermal mass provides a time-delayed delivery. Inside the living cubes, space conditioning is provided by a radiant ceiling heating and cooling system. During the winter months, the central ceiling fan in the main hall can be used to push the warm air back down towards the floor. In addition, the spatial delineation of the common space through floor-to-ceiling curtains can create zones with very high comfort levels. The supply of domestic hot water is organized in two steps. A separate heating cycle pre-heats the cold water using plate heat exchangers near the living cubes. The individual hot water temperature is obtained through electric continuous-flow heaters in each living unit; distribution losses are avoided and the energy-demand from the heat pump is reduced because it only has to supply water at a low-temperature heating level.  Image 23: https://cubity.de/cubity/  Image 24: https://cubity.de/cubity/
Solid waste management:	Assumption: connected to local network

Implementation data	
Implemented?	Yes
Designer:	TU Darmstadt
Client:	Solar Decathlon Europe
Executing company:	DFH Deutsche Fertighaus Holding AG, Forschungs- und Materialpartner
Cost of construction:	Prototype € 1.200/m2 (GFA) total floor space
Funding:	state (university) and private (project partners)
Plot ownership:	1st: exhibition ground; 2nd: owned by Nassauische Heimstätte corporation
PUE-related patents:	
Life cycle aspects	
Expected time of PUE on-site:	15 days at Versailles 3 years in Frankfurt - will be deconstructed in summer 2021 and set up at another spot (https://www.hessen-schafft-wissen.de/)
Reversibility:	can be removed
Planned reuse/recycling:	modules can be reused
Potential/planned secondary use concepts for TH-units:	student housing in Frankfurt (see above)
Repurpose, reuse, new development of site/building:	building has been designed for exhibition; has been disassembled and moved to Frankfurt; apparently the use of the area is student living on the site already
Innovation aspects:	“living lab”: living together with small private space and a lot of community space e.g., ”market square” (http://cubity.de/en/living-lab/); project is being monitored
Comments & references	

Additional references:	http://cubity.de/en/about-cubity/ http://www.nhps-stadtentwicklung.de https://www.wohnen-in-der-mitte.de/ https://www.hessen-schafft-wissen.de/

12. EMERGENCY AND INITIAL RECEPTION CENTER, HAMBURG

Project website:

http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/not-und-erstaufnahmeeinrichtungen-hamburg

Image 25: Malte Metag

Image 26: https://www.thelevelmarket.com/

Project description:

24 m² tents that can be connected with each other; used as community space in this PUE but can be used as living units, too.

Particularities of the Project:

resistant tents that can be connected

User specific aspects	
User groups:	refugees on their journey
Drivers/triggers:	high demand for temporary housing for refugees on their journey
Social mix & cohesion:	not specified; assumption: no social mix
Gender-sensitive aspects:	not specified in this PUE; space for men and women can be built (Source: Zukunftsinstitut); “Other DOMOs are deployed as child friendly spaces or for women travelling on their own” (Source: Thelevelmarket)

Location and environment	
Location:	Schnackenburgallee, 22525 Hamburg, Germany; exact location not specified but possibly here: 53.5819 9.9131 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	this PUE Example is probably only a part of a PUE built in 2015 to react to the high demand for temporary housing.
Climate:	Temperate
Sea level:	28 m
Physical properties	
Site type:	green land (field)
Plot area:	not specified
Construction type:	Tent
Foundation type:	none; (tent pegs)
Building type:	Tent
Equipment & facilities:	no facilities; depending on PUE
Connection to neighboring buildings:	Connection to neighboring buildings: the tents in this PUE are connected in a "L"-shape; they can be freestanding or connected to others (duplex/or connected to up to 6 tents) (Source: Szenehamburg)
Materials used:	○ Supporting structure: Foldable pre-assembled hollow-profile aluminium crossbar structure, sandblasted ○ Bathtub floor 100% polyester PVC tarpaulin, 540 g/m2 ○ DOMO COTTON shell (standard configuration) 100% cotton, 285 g/m2, hydrostatic head: 350 mm ○ DOMO TC shell Technical cotton, 65% polyester, 35% cotton 185 g/m2, hydrostatic head: 1000 mm ○ DOMO RS shell 100% Ripstop polyester PU, hydrostatic head: 3000 mm ○ DOMO SOLID shell Insulating sandwich panels, status: prototyping (Source: Thelevelmarket)

No. of buildings:	9
No. of residential units:	0
Storey count:	1
No. of persons per unit:	no living unit (used as community space); in other uses: up to 10 persons/unit (Source: Thelevelmarket)
Built area:	23 m²/tent
Integration of recreational and/or productive opportunities:	the community spaces are used for recreational activities
Utilities	
Sanitation system:	Assumption: not connected as it doesn't function as a living space
Electricity:	Assumption: connected to local network
HVAC:	there is heating in the units, but no further details are provided
Solid waste management:	Assumption: connected to local network
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	Daniel Kerber, More than Shelters
Cost of construction:	€ 3.500/unit
Funding:	donations (Source: Szenehamburg)
Plot ownership:	Assumption: public
Life cycle aspects	
Expected time of PUE on-site:	temporary (assumption: some months until 2 years)

Expected total life time:	> 10 years (Source: Morethanshelters)
Reversibility:	can be removed within one hour
Planned reuse/recycling:	parts of unit can be replaced to make the PUE last longer
Potential/planned secondary use concepts for TH-units:	not specified; the designers promote it also for other uses: (user groups: festival artists and visitors)
Adaptability:	can be adapted to living space, community space,...; can be connected to other units
Repurpose, reuse, new development of site/building:	festival visitors and artists
Comments & references	
Additional comments:	There have been built up to 9 units at Schnackenburgallee, 5 in Bergedorf und Jenfeld and 2 at Hauptbahnhof (all in Hamburg) Zoning plan: special building area (Sondergebiet)
Additional references:	https://www.zukunftsinstitut.de/artikel/die-zukunft-der-fluechtlingsarbeit/ https://www.thelevelmarket.com/ http://szene-hamburg.com/an-den-abenden-wird-hier-oft-getanzt/ http://www.morethanshelters.org/de/domo/ http://www.hamburg.de/planportal/ https://www.spiegel.de/panorama/gesellschaft/asylbewerber-in-hamburg-unterkunft-in-schnackenburgallee-a-992475.html https://nixgut.wordpress.com/2015/08/18/hamburg-bahrenfeld-3000-neue-flchtlinge-auf-hsv-parkplatz/ https://www.eimsbuetteler-nachrichten.de/roma-sinti-durchreiseplatz-schnackenburgallee-aufloesung/ https://www.spiegel.de/fotostrecke/asylbewerber-in-hamburg-das-camp-auf-parkplatz-braun-fotostrecke-119159.html https://www.zeit.de/hamburg/stadtleben/2016-08/fluechtlingsunterkunft-volksparkstadion-fluechtlinge-hamburg-wohnwagen-roma-sinti-bahrenfeld

13. POP-DOWN HOTEL

Project website:

www.google.com

Image 27: https://www.popdownhotel.com/

Image 28: https://www.blog.tirol/2017/12/pop-down-hotel-im-zillertal/

Project description:

hotel for 140 days

Particularities of the Project:

an old hotel that should be renovated in 2018 has been used temporarily as hotel for 150 days

User specific aspects	
User groups:	tourists; locals (for social meetings, events, ...)
Drivers/triggers:	the owners wanted to make this “pop up hotel” for the winter season before they start to renovate the building
Social mix & cohesion:	tourists with locals
Location and environment	
Location:	Großriedstrasse 16, 6273 Ried im Zillertal, Austria 47.3021, 11.8679 [Show on map]
Surrounding environment:	Rural environment
Type of setting:	Formal

Climate:	Continental
Sea level:	572 m
Physical properties	
Site type:	building land
Construction type:	Load-bearing wall (assumption according to pictures)
Building type:	building (more than 2 units per building)
Equipment & facilities:	furnished bedrooms, bathroom, some have a balcony
Connection to neighboring buildings:	detached (free standing)
Materials used:	old building; assumption of materials: bricks, mortar, wood, concrete, etc.
No. of buildings:	2 (hotel plus guest house across the street)
No. of residential units:	26
Storey count:	3,5 (3 full floors plus reconditioned attic)
No. of persons per unit:	1-4
Integration of recreational and/or productive opportunities:	access to a pool, bar, restaurant
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connected to local network
Solid waste management:	connected to local network
Implementation data	
Implemented?	Yes

Year of construction:	Pop-up environment: 2017 Building is older
Client:	Private
Funding:	Private
Plot ownership:	Private
Life cycle aspects	
Expected time of PUE on-site:	150 days (of usage)
Reversibility:	house can be removed with more or less traces; PUE can be removed more easily
Planned reuse/recycling:	unit should be renovated and reopened as a hotel; for now, that has been postponed
Adaptability:	could be adapted for other users
Innovation aspects:	meeting space for locals and tourists; hotel for 150 days;
Comments & references	
Additional references:	https://www.facebook.com/pg/popdownhotel/posts/ https://www.blog.tirol/2017/12/pop-down-hotel-im-zillertal/ https://www.popdownhotel.com/

Image 29: https://maps.tirol.gv.at

14. FEEL HOME TAUFKIRCHEN

Project website:

http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/modulbauten-in-holzstaenderbauweise-taufkirchen

Image 30: http://www.makingheimat.de/fluechtlingsunterkuenfte/datenbank/modulbauten-in-holzstaenderbauweise-taufkirchen

Image 31: http://www.makingheimat.de/content/4-fluechtlingsunterkuenfte/1-datenbank/Datenbank_Flu%CC%88chtlingsunterku%CC%88nfte.pdf

Project description:

7 two-story free-standing buildings that consist in 4 living units each hosting 224 asylum seekers in total. “The guiding principle of the FEEL HOME housing concept is the homogeneous integration into existing residential developments of architecturally sophisticated temporary and solid buildings in order to accommodate asylum seekers in a contemporary, humanitarian manner that can be communicated to the population. Taufkirchen is one of 11 projects currently realized or in planning in the Munich district. The asylum village is adjacent to the residential area along the S-Bahn line to Munich, and is located directly next to a secondary school and daycare center, a 5-minute walk to the shopping center at the train station.” (Excerpt from explanatory report. Source: Makingheimat)

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	high demand for accommodation for asylum seekers in 2015
Social mix & cohesion:	not specified; the settlement is built next to a school
Location and environment	

Location:	82024 Taufkirchen, Germany 48.0480 11.6084 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	green land
Plot area:	not specified (measured in google earth around 5.000 m²)
Construction type:	prefabricated wood modules (Source: Berlinaward, p.38)
Building type:	building (more than 2 units per building)
Equipment & facilities:	rooms fully furnished, kitchen, 2 bathrooms (Source: Berlinaward)
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood, among others
No. of buildings:	7 buildings
No. of residential units:	28
Storey count:	2
No. of persons per unit:	8
Built area:	7 m²
Area per person:	not specified (measured in google earth around 1000 m²); GFA: 2191 m2 (Source: Berlinaward) results in 1095,5 m² built area
Integration of recreational and/or productive opportunities:	playground, bike rack, parking lot

Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connected to local network; ENEV Energiesparverordung 2014
HVAC:	Hot water heating, operated by electricity with heat recovery by an air heat pump. The radiators are located in the floor or in the ceiling (depending on the type of house) (Source: Makingheimat PDF)
Solid waste management:	collection point for separate collection on the plot (Source: Makingheimat PDF); connected to local system
Implementation data	
Implemented?	Yes
Year of construction:	2016
Designer:	Sacher GmbH; Dipl–Ing. Bernd Sacher; Concept and Project Development: ehret + klein GmbH, Dipl.-Ing. Michael Ehret
Client:	Landrat is renting it from owner (Source: Süddeutsche 2)
Executing company:	DiamondModule GmbH, Wien
Cost of construction:	€ 144.000/unit (Source: Berlinaward) results in total cost of € 4.032.000
Funding:	private (Source: Süddeutsche)
Plot ownership:	not specified; Assumption: private (Source: Süddeutsche)
Life cycle aspects	
Expected time of PUE on-site:	10 years

Expected total life time:	not specified; one newspaper article says: Nobody knows if the buildings would last longer if needed. Company spokeswoman Anke Witzel says: “We can only tell in ten years time”. (Source: Merkur)
Planned reuse/recycling:	“After ten years, the buildings could serve the homeless or students, says Ehret, they could also be demolished and disposed of in an environmentally sound manner” (Source: Süddeutsche)
Adaptability:	“The houses could be built in small parts, adapted to the respective location and correspond to the requirements of the standard space book of the state government.” (Comment by M. Ehret, CEO of a participating company. Source: Süddeutsche)”
Comments & references	
Additional comments:	2 months construction period (Source: Berlinaward) settlements made out of these modules also exist in Gräfelfing, Taufkirchen and Haar; in Ismaning, Höhenkirchen-Siegertsbrunn, Oberhaching, Planegg and Ottobrunn they were approved but not built yet (2016)
Additional references:	http://www.makingheimat.de/ http://www.sueddeutsche.de/ http://www.sueddeutsche.de/ https://www.stadtentwicklung.berlin.de/ https://www.merkur.de/

15. POP UP DORMS, SEESTADT ASPERN

Project website:

https://www.home4students.at/wohnen/studentenheime-wien/popup-dorms-seestadt-aspern/

Image 32: https://www.home4students.at/wohnen/studentenheime-wien/popup-dorms-seestadt-aspern/

Image 33: https://www.home4students.at/wohnen/studentenheime-wien/popup-dorms-seestadt-aspern/

Project description:

Plots in Seestadt Aspern are not used for permanent buildings for the next 5 years. Thus, the plots are used for temporary living in the meantime, offering student accommodation (flat-sharing style - WG) in wooden boxes (cheap and ecologically sound). Those wooden boxes are flexible and easily dismantled and re-erected at a different location.

Particularities of the Project:

This example is located in Vienna and offers an example of temporary housing in passive house standard.

User specific aspects	
User groups:	Students. If there are not enough applications by students, also other persons may apply for a pop-up-dorm room.
Drivers/triggers:	Living space for students is needed in Vienna.
Social mix & cohesion:	Mainly students. If there are not enough applications by students, also other persons may apply for a pop-up-dorm room. No information given on relationship with neighborhood.
Gender-sensitive aspects:	Each living box (“Wohnbox”) has room for 4 persons. The Wohnboxes are gender-separately assigned to students. Exceptions are made upon request (e.g., for couples or siblings.)

Location and environment	
Location:	Sonnenallee 28-30 (Ecke Maria-Tusch-Straße) 48.2248 16.5034 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	approx. 154 m
Physical properties	
Site type:	grey field
Plot area:	3654 m²
Construction type:	pre-fabricated passive house
Foundation type:	reusable individual footing/punctual foundation made of concrete
Building type:	building (more than 2 units per building)
Equipment & facilities:	furnished bedroom, shared kitchen, bathroom toilets, shared laundry facilities, common room
Connection to neighboring buildings:	detached (free standing)
Materials used:	Wood
No. of buildings:	2
No. of residential units:	10 in each building
Storey count:	2
No. of persons per unit:	4 persons in a shared-flat, 1 person per room
Built area:	788+723=1511 m²

Area per person:	1 module is 16,8m x 5,5m = 92,4 m²/4 = 23,1 m² per person EDIT 05.05.2021: Apparently, the size of residential units is 75 m2, which results in 18,75 m2 per resident. Average room size is assumed to be 12,5 m2.
Integration of recreational and/or productive opportunities:	not specified. Seestadt lake is close by
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	PV panels on the roof
HVAC:	air heating pump
Solid waste management:	connected to Viennese solid waste management system
Implementation data	
Implemented?	Yes
Year of construction:	2015 and 2016
Designer:	F2 Architekten and Obermayr Holzkonstruktionen (WBV-GPA, 2018)
Client:	not specified. Pop-up dorms is operated by home4students and OeAD
Cost of construction:	Low land, construction and operating costs. With this project, the concept of affordable housing was perfectly implemented. In addition to the very low land costs, the freely financed pioneer project also has minimal construction costs of only € 1,140/m² and is thus far below the usual construction costs (öNORM B 1801-1). The project is thus the best example of the fact that energy efficient construction and socially affordable housing are in no contradiction. Although the project is being built without housing subsidies, students are expected to pay no more than 350 euros per month per residential unit, including all operating costs.
Funding:	funded by foundation

Life cycle aspects	
Expected time of PUE on-site:	5 years; transfer planned for summer vacation 2020 ([Link]) or 2022 (http://www.wbvgpa. at/media/calameopdf/20 WBVBuch2018. pdf)
Expected total life time:	
Reversibility:	
Planned reuse/recycling:	The pop-up units are designed to be easily dismantled and re-assembled at a different location. Not specified, if there are specific plans for reuse of the pop-up dorms.
Potential/planned secondary use concepts for TH-units:	not specified, however the design of the dorms would allow secondary uses.
Adaptability:	No. The rooms and shared facilities are fully furnished. There are penalty fees for adjusting, modifying the rooms / furniture (e.g., using nails for putting up a picture.)
Repurpose, reuse, new development of site/building:	Site is designated to be built-on within the next years. In the meantime, the empty plot is used for temporary student dorms.
Comments & references	
Additional references:	https://www.youtube.com/ https://www.home4students.at/ http://www.obermayr.at/ https://www.e-genius.at/ https://passivhaus-austria.org/ https://passivhaus-austria.org/ https://passivhaus-austria.org/ https://www.derstandard.at/ https://www.exclusive-bauen-wohnen.at/ WBV-GPA (2018): Die Projekte der WBVGPA aus den Jahren 2016 bis 2018. http://www.wbvgpa.at/media/calameopdf/20WBVBuch2018.pdf

16. MICRO COMPACT HOME

Project website:

http://www.microcompacthome.at/

Image 34: http://www.microcompacthome.at/projects/?con=o2

Image 35: http://www.microcompacthome.at/projects/?con=low

Project description:

The micro compact home is a high quality compact dwelling for one or two people. Its neat dimensions of a 2.66m cube adapt it to a variety of sites and circumstances, and its functioning spaces of sleeping, working/dining, cooking and hygiene make it suitable for everyday use. M-ch was initially designed as an answer to an increasing demand for short stay living accommodation for students, business people, sports and leisure use and for weekenders. The m-ch combines techniques for high quality compact “living” spaces deployed in aircraft, yachts, cars, and micro apartments. Living in an m-ch means focusing on the essential - less is more. The use of progressive materials complements the sleek design. Quality of design, touch and use are the key objectives for the micro compact home team for ”short stay smart living”.

Particularities of the Project:

Very small dimensions (2,66 x 2,66 x 2,66 m) allow high flexibility in transport (by lorry or helicopter) and can easily fit in small plots. In its pilot phase it was installed as a cluster assembly of various single units as student housing.

User specific aspects	
User groups:	In its pilot phase it was used by students in Munich. Students, businesspeople, sports and leisure use and weekenders are listed as target audience.

Drivers/triggers:	Initially: Need for living space for students. The living cubes were designed and conceptualized within a research project, thus creating an innovative tiny house might have also been a driver
Social mix & cohesion:	not specified, will vary from case to case.
Location and environment	
Location:	formerly: O2 student village in Munich (close to English Garden). As the living cube is a commercial product there might be various private location where the tiny houses are situated. The company is based in Munich and London, production site is in Uttendorf, Austria and sales region is Europe. 48.1816 11.6123 [Show on map]
Surrounding environment:	both rural and urban installations of the m-ch cubicle have been realized
Type of setting:	formal (commercial product)
Climate:	Temperate
Physical properties	
Site type:	varies from case to case
Plot area:	varies from case to case
Construction type:	Prefabricated
Foundation type:	simple pad foundations
Building type:	house (1-2 units per building)
Weather resistance:	There is a thick waterproof layer protected behind the aluminium rain-screen cladding. Rain drains from the roof through the rainscreen cladding and the waterproof layer, to avoid staining on the outer surface.
Equipment & facilities:	It includes techniques for high quality compact living spaces deployed in aircraft, yachts, cars, and micro apartments. m-ch features:

	○ Two compact double beds, each measuring 198cm x 107cm, with covered cushions. ○ Storage space for bedding and cleaning equipment. ○ Sliding table measuring 105cm x 65cm, ○ for dining for up to five people. ○ Flat screen television in the living/dining space ○ Shower and toilet cubicle ○ Kitchen area fitted with electrical points and featuring a double hob, sink and extending tap, microwave, fridge and freezer units, three compartment waste unit, storage shelves, cutlery drawers with gentle return sprung slides and double level work surfaces. ○ Air conditioning, water heating, fire alarm and smoke detectors. ○ Thermostat controlled ducted warm air heating or electric under floor are available alternatives
Connection to neighboring buildings:	detached (free standing)
Materials used:	Structure, walls, floors, roof are made from timber for lightness, economy and to minimize carbon emissions. In special cases (e.g., helicopter delivery) an aluminium frame is used. An aluminium subframe is installed prior to delivery of the prefabricated house Approx. one third of a standard micro home (2.2 tons) is plywood and timber framing. “The m-ch has a timber frame structure with anodised or polyester powder coated aluminium external cladding finishes, insulated with polyurethane foam and fitted with aluminium frame double glazed windows and front door with security double lock”
No. of buildings:	varies from case to case. Pilot study (student village in Munich) consisted of 7 units
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Built area:	7 m²
Area per person:	6,5 m²; The ceiling height is 198cm and the door width is 60cm.
Integration of recreational and/or productive opportunities:	not specified. A small terrace is integrated in the design (in addition to the 7 m² cubicle)

Utilities	
Water supply:	The m-ch cubicle requires connection to water supply.
Sanitation system:	The m-ch cublicle requires connection to drainage.
Electricity:	varies from case to case. For the m-ch cublicle an external single electrical supply is necessary.
HVAC:	not specified; assumption: electric heating ”In a cold winter month the m-ch should use no more than 348kWh and in the summer, using air conditioning, approximately 123 kWh. It is possible to be highly energy efficient in the use of an m-ch. Since it has a small air volume, it heats and cools very quickly.”
Solid waste management:	3 compartment waste unit is installed into the living cube. general solid waste management system varies from case to case. Connection to local existing solid waste management system.
Implementation data	
Implemented?	Yes, e.g., O2 student village in Munich or micro home 026 overlooking Lake Zurich at Erlenbach in Switzerland
Year of construction:	pilot study: O2 student village Munich started in 2005
Designer:	Richard Horden
Client:	private clients
Executing company:	Gatterbauer m-c-h production GmbH, Uttendorf, Austria
Cost of construction:	38.000€ for a single unit, does not include delivery, installation and connection to services, consultant’s fees and taxes. Subject to site conditions the inclusive guide price is 50,000-90,000 EUR depending on the landscape fees and infrastructure.
Funding:	private
Construction time:	8-10 weeks for manufacturing and delivery. Assumption: Installation on-site is done quickly (1 day for preparation works, 1 day for installation)

Life cycle aspects	
Expected time of PUE on-site:	varies from case to case
Expected total life time:	”Like a car, the lifespan of the m-ch is dependent on the care in use. The guarantee for the main frame, the aluminum cladding and windows is for five years. Service elements and fittings may require service or replacement, as would normal domestic appliances. All replacement parts can be ordered through m-ch ltd.”
Reversibility:	not specified. Assumption: high reversibility of plot.
Planned reuse/recycling:	”Your m-ch can be collected by the factory and recycled. It could also be replaced with a new one in a single delivery. A finished m-ch may be sold to a second user or be recycled by the factory into new m-ch units. The aluminium is very efficiently recycled with only 0.3% wastage in the process and with only 11% of the energy required to make the aluminium in the first instance.”
Use of reused/recycled materials during construction:	see above. It seems that parts of the units can be refurbished and recycled by the factory into new m-ch units. Comment: No details available on whether this is just a concept or a real-life practise.
Adaptability:	There is the option for cluster assembly. ”The m-ch units can be modified with a second door at the kitchen end and a connecting link to another m-ch unit. This would provide short stay accommodation for two or four people.” The inside of the cubicle is most likely not adaptable at all. In order to squeeze into 6,5 m² all different residential uses (sleeping, cooking, eating, washing / hygiene, ...) every cm of the m-ch is well thought through and all storage space is preset and built-in.
Innovation aspects:	integration of all basic living functions into a cubicle of 2,66 m (approx. 6,5 m²)
Comments & references	
Additional comments:	Delivery by trucks (up to 5 living cubicles per truck load) or helicopter is possible. Spin-offs of the student village were the Tree Village, the golden cube, low e-home and snowboard village, in order to demonstrate how the basic concept can be adapted for a number of uses, environments and cultures. [Link]

	"The first eco balance report was completed in 2005 at the Technical University in Munich and is a detailed full life cycle analysis of the materials used in the construction, through to the final recycling and disposal. The report includes details of the energy balance and the energy required to manufacture and deliver materials to the factory and to the site. A "low.e-home" version is available with potentially zero CO2 emissions. This is powered by PV solar cells and a small vertical axis wind generator mounted on the roof and mast." Regarding security: "m-ch windows are made of heavy duty toughened glass, the door has a double security lock and the construction of walls, floor and roof have six layers of material, making it quite difficult to penetrate. A security alarm can be fitted and personal call system if required. Fire alarm and smoke detectors are standard." One potential application is the low e-home: "The micro-compact low e-home is all-electric and powered by photovoltaic solar panels of 8 m² with a small diameter vertical axis wind generator. Daytime excess power is diverted into the grid. The wind turbine and reserve batteries provide nighttime power. Heating and air conditioning is ducted to each of the four function spaces. Long duration LED lighting is used internally and for the external walkways." Comment: It is not specified if the low e-home is just a concept, or if it has a real life implementation.

17. BETTER SHELTER AT KARA TEPE CAMP, LESVOS

Project website:
http://www.bettershelter.org/wp-content/uploads/2015/12/About_Better-Shelter.pdf

Image 36: https://learninglyceum.org/2016/07/05/kara-tepe-refugee-camp-day-1/

Image 37: The Guardian

Project description:
tents with rigid walls for families

Particularities of the Project:
tents that have rigid walls and roof

User specific aspects	
User groups:	refugees
Drivers/triggers:	high demand on refugee's accommodation
Gender-sensitive aspects:	in the camp there is a child and women friendly area (see map document on reliefweb.int)
Location and environment	
Location:	Al Jamea'a Camp; Baghdad Governorate, Iraq 33.3112 44.3158 [Show on map] Kara Tepe, Lesvos, Greece: 39.128092, 26.545140 [Show on map]
Surrounding environment:	Rural environment

Type of setting:	refugee camp
Climate:	Temperate
Sea level:	2 m
Physical properties	
Site type:	green field
Plot area:	not specified; measured on google earth: 54.000 m² (= 5,4ha)
Construction type:	prefabricated building
Foundation type:	not specified; (none)
Building type:	house (1-2 units per building)
Equipment & facilities:	photovoltaic system with light + plug that provides light and USB power
Connection to neighboring buildings:	detached (free standing)
Materials used:	frame: galvanised steel, polyolefin; walls and roof: panels treated with UV protection (see Image 37: The Guardian)
No. of buildings:	approximately 156 units (Source: Reliefweb)
No. of residential units:	approximately 160
Storey count:	1
No. of persons per unit:	up to 5 persons
Built area:	not specified; approx. half of territory; one unit occupies 17,5 m²
Area per person:	3,5 m²/ person
Utilities	
Water supply:	the units don’t have a water supply, there are sanitary areas in the camp

Sanitation system:	the units don't have a water supply, there are sanitary areas in the camp
Electricity:	Independent via a photovoltaic panel, which charges an LED light during the day. Once fully charged, the light can be used for 6-48 hours and also charge a mobile phone through a USB port. (it's possible that it provides only 4h light/day; some sources say different things (Source: Bettershelter))
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	Better shelter (partners are IKEA Foundation and UNHCR)
Client:	not specified; maybe Municipality of Lesvos
Executing company:	not specified; probably IKEA Foundation
Cost of construction:	€ 1.050
Life cycle aspects	
Expected time of PUE on-site:	not specified; exists since 2015
Expected total life time:	expected life time of units: 3 years
Reversibility:	can be removed easily within some hours
Planned reuse/recycling:	not specified; unit parts can be replaced easily
Adaptability:	units can be adapted to be used as another structure (register stand, community space,..)
Comments & references	
Additional comments:	Zoning plan of PUE: category Sportfield (Source: Mytilene) one unit can be built up within 4 hours (4 persons), it weights only 162 kg. Shelters are more resistant to external factors than cloth tents: tested to resistant wind speed of 18 m/s; snow load of 10 kg/ m²

	Zurich wanted to purchase 62 units but then cancelled the order as it is not fire resistant enough for their policies (Theguardian); Better Shelter said, it would improve it
Additional references:	https://reliefweb.int/ http://www.bettershelter.org/wp-content/uploads/2015/12/About_Better-Shelter.pdf https://www.theguardian.com/ (1) https://www.theguardian.com/ (2) http://ifrc-sru.org/wp-content/uploads/2016/06/Refugee-Housing-Unit_Tim-deHaas_Better-Shelter.pdf http://www.mytilene.gr/

Image 38: https://reliefweb.int/map/greece/greece-municipality-lesvos-kara-tepe-site-2-february-2016

18. MICROHOME

Project website:

https://www.genboeck.at/Häuser-und-Projekte/microHOME-Mobiles-Wohnen/microHOME-HOME-TO-GO/113-microHOME-Ausstattungspakete

Image 39: Genböck Haus

Project description:

The solution for people who are looking for an uncomplicated and mobile home.

Particularities of the Project:

It is produced by an Austrian company and easy to transport.

User specific aspects	
User groups:	○ for singles and young families as an affordable first home ○ as an annex for children or an office ○ as a holiday apartment ○ as a weekend home ○ for seasonal summer and winter use in tourist areas ○ as comfortable accommodation on campsites ○ as a mobile shop and much more
Drivers/triggers:	Mobility
Location and environment	
Type of setting:	It is for formal setting.

Physical properties	
Site type:	Mobile
Construction type:	Wooden frame construction with turning and lifting mechanism
Foundation type:	screw foundation
Building type:	house (1-2 units per building)
Weather resistance:	Western European standard
Equipment & facilities:	shower, toilet, the entire house technology
Connection to neighboring buildings:	detached (free standing)
Materials used:	Wood
Storey count:	1
Built area:	44 to 66 m²
Integration of recreational and/or productive opportunities:	modular expandable
Utilities	
Water supply:	connected to centralised water supply system; Western European standard
Sanitation system:	connected to centralised wastewater system; Western European standard
Electricity:	Western European standard
HVAC:	Complete building technology with infrared heating, electrical and sanitary installation, LED lighting
Solid waste management:	Austrian standard
Implementation data	

Implemented?	Yes, available for order.
Year of construction:	2018
Designer:	Genböck Haus
Client:	Private
Executing company:	Genböck Haus
Funding:	Private
PUE-related patents:	
Life cycle aspects	
Expected time of PUE on-site:	upon need
Reversibility:	yes
Planned reuse/recycling:	reuse unit
Potential/planned secondary use concepts for TH-units:	Yes
Adaptability:	Yes, modular
Repurpose, reuse, new development of site/building:	“Fold, lift, transport, lift open - Done, that’s how easy it is. Within a few days you can move from one place to another - your house comes along. Rapid relocation without the need to dismantle installations and equipment.”
Innovation aspects:	A transportable small building at the state of the art

19. YMCA'S Y:CUBE HOUSE

Project website:

https://www.fastcompany.com/3026691/tiny-prefab-50000-homes-could-make-outrageously-expensive-cities-affordable

Image 40: YMCA

Image 41: YMCA

Project description:

The YMCA's Y:Cube houses are cheap in part because they're so quick to build; the home is fully constructed and finished in a nearby factory, and then can be set in place almost instantly.

"It's about speed and process," says Ivan Harbour, a partner at Roger Stirk Harbour + Partners, the architects for the development. "It's not reduced quality. The same money–probably actually more money–is spent on the quality of the materials and finishes."

Special timber-framed panels called Insulshell, which architects also used to build the Velodrome for the London Olympics, make the building not only simple to construct, but so airtight it takes almost no energy to heat.

The tiny homes–a little less than 300 square feet for a bedroom, living room, kitchen, and bathroom–are each intended for only one person, but they're also designed to easily stack on top of each other to form a community.

They're reminiscent in some ways of the micro-apartments that have been popping up in other expensive cities, like New York and San Francisco. But it sounds like the Y:Cube homes will be even cheaper.

Particularities of the Project:

The architects carefully planned each aspect of the exterior, from the gate to the front door, so that the new residents can connect with neighbors. "We're trying to create places where people can go and feel like they're part of the community," says Harbour. "That whole sequence of spaces is essential so people don't feel like they've been ghettoized."

User specific aspects	
User groups:	Locals
Location and environment	
Location:	200 The Broadway, Wimbledon, London, UK 51.4197, -0.1967 [Show on map]
Surrounding environment:	Urban environment
Climate:	Continental
Physical properties	
Plot area:	30 m²
Construction type:	Prefabricated building
Foundation type:	Buttresses
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	timber-framed panels
No. of residential units:	1
Storey count:	1
No. of persons per unit:	4
Built area:	30 m²
Area per person:	7,5 m²
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater supply system

Implementation data	
Implemented?	Yes
Year of construction:	2014
Designer:	YMCA
Executing company:	YMCA
Cost of construction:	50.000$
Funding:	Social investors

20. LITTLE HOME KÖLN E.V.

Project website:

https://little-home.eu/neues/

Image 42: https://little-home.eu/neues/

Image 43: Olaf Selchow

Project description:

A former photographer started building tiny wooden boxes (plywood, Euro-pallets) as homes for homeless people. The tiny living boxes are installed with small wheels in order to ensure not clashing with the legal framework by being able to move them around minimum 100 meters every 90 days (thus avoiding a building permit). The Little Homes are considered a place where people are protected from cold and wet weather where they can store their belongings reasonably safe without constant fear of getting robbed, molested or threatened.

Particularities of the Project:

This housing boxes are given as presents to homeless people as a tiny, dry and lockable place, where they can sleep and store their few belongings and hopefully enables them to rest a bit and to gather the strength and courage to start building a better live again.

The project aims not only to provide housing but sees itself as potential “lifeline” / second chance for homeless people.

User specific aspects	
User groups:	homeless people. Little homes are ideally allocated to homeless people who are not suffering from alcoholism or drug abuse or have ongoing criminal files. Those who are most in need get higher priority. Persons, who are motivated to use the Little House as a launching pad for a new, independent life are considered for Little houses.
Drivers/triggers:	Providing the most basic shelter for homeless people, so that they have a dry place to sleep and store their belongings.

	The aspect of helping is very much embedded into the project's philosophy. "Simply realizing one's desire to help"
User experience:	The first housing box was given to a young homeless woman. It was her first home since many years: "It's just 3,2 m² but means the world to her." How do the receivers react? - They are incredibly happy and grateful. Often there are some tears, they are deeply moved.
Location and environment	
Location:	not specified. There are Little Homes in Köln (where it all started), Bonn, Hamm, Berlin, Frankfurt/Main, Nürnberg. More cities could follow
Surrounding environment:	Urban environment
Type of setting:	not specified, Assumption: tending towards informal setting (e.g., avoiding building permits, etc.)
Climate:	Temperate
Physical properties	
Site type:	not specified. Varies from case to case.
Construction type:	Wooden, do it yourself construction from material from hardware stores. Measurements: Height: 1,9m, Width 1,2m, length 3,2m.
Foundation type:	none, as the Little Homes are movable on wheels.
Building type:	more a shed than a house
Weather resistance:	Not specified Assumption: Living conditions in Little homes might deteriorate over time as material might be selected in regards to affordability rather than durability for longer periods. As the houses are built in DIY style, it might be easy to fix and patch the Little house, once the hull gets leaky.
Equipment & facilities:	Mattress, small shelf, first aid kit, fire extinguisher, small worktop, sink, camping toilet, cooking option.
Connection to neighboring buildings:	detached (free standing)

Materials used:	3,5 euro-pallets, plywood, chipboard, battens, insulating material, roofing felt
No. of buildings:	1
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Built area:	3,5 m²
Area per person:	3,5 m²
Integration of recreational and/or productive opportunities:	not specified, assumption: none.
Utilities	
Water supply:	Assumption: not connected. Water might be fetched somewhere and used in jugs for cooking / basic washing.
Sanitation system:	not connected to centralised sewer system; a camping toilet is included
Implementation data	
Implemented?	yes, in 2017 there were 32 Little houses in Köln, Berlin, Frankfurt, Hamm, Nürnberg. Expansion to Hamburg, Leipzig and München are planned. There is a waiting list of homeless people who hope to receive a Little House.
Year of construction:	project started in 2016
Designer:	Sven Lüdecke (project lead)
Client:	The association Little House e.V. gives the Little Houses as presents to selected homeless persons (allocation criteria: see above)
Executing company:	The houses are built DIY-style by all kinds of volunteers: students, entrepreneurs, retired people, ... Some make donations, others offer their manpower. Also, the homeless persons, who later live in the Little House are often part of the construction team.

Cost of construction:	Costs per house are about 650€ (construction - excluding working hours + interiors - mattresses, fire extinguisher, etc.). Transportation costs are about 200-300€
Funding:	private donations. Volunteers are helping with manpower for construction, or donations and donations in kind (e.g., mattresses, bedsheets, construction materials), means of transportation or ”catering” for the construction teams.
Plot ownership:	Little homes can only be located on private land.
PUE-related patents:	not specified. Assumption: None. Some architects provided construction plans / blueprints for Little Houses. Those are available open access at the project website for easier implementation in other locations.
Life cycle aspects	
Reversibility:	There are no foundations (houses on wheels), thus there should not be any problems for reversibility.
Adaptability:	not specified. Assumption: limited adaptability due to space constraints.
Comments & references	
Additional comments:	Sven Lüdecke (head of project) was inspired to implement his Little House project by a TV show featuring the American Gregory Kloehn, who builds living boxes for homeless people from bulky waste only.

21. HOME 21

Project website:

http://trans-city.at/tc/portfolio/siemensstrasse/

Image 44: http://www.kallco.at/kallco-in-bildern/home-21

Project description:

241 subsidized living units on industrial area with limited permission for 10 years (for now) (Source: Der Standard, 2018)

Particularities of the Project:

part of cities' immediate action program (Sofortprogramm der Stadt Wien, 2016)

User specific aspects	
User groups:	singles, families, homeless 66% social housing (Wohnservice Wien), 34% homeless (allocated by Obdach Wien and Caritas)
Drivers/triggers:	high demand of rapidly available living space
Social mix & cohesion:	mixed; Vienna residents (under the "Wohnticket"-scheme), homeless people
Gender-sensitive aspects:	not specified; some units are reserved for mothers with children
Location and environment	
Location:	Siemensstraße 142, 1210 Vienna, Austria 48.2663 16.4295 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	formal setting
Climate:	Continental
Sea level:	161 m
Physical properties	
Site type:	industrial area (business park)
Plot area:	13.000 m²
Construction type:	rigid frame (see Image 45)
Foundation type:	not specified; assumption: concrete foundation; (there is no underground car park)
Building type:	building (more than 2 units per building)
Equipment & facilities:	kitchen, bathroom, furniture (has to be rented for €0,8/m²), washing machine connection
Connection to neighboring buildings:	detached (free standing)
Materials used:	concrete, steel (among others)
No. of buildings:	2 (see Image 45)
No. of residential units:	241
Storey count:	4 (some parts 5)
No. of persons per unit:	not specified but apartments are rather small (<50 m² in average)
Built area:	not specified; estimated at wien.gv.at: 4.700 m²; GFA 18.014 m² divided by 4 storeys: 4.500 m²
Integration of recreational and/or productive opportunities:	private open space: balconies; shared space: laundry room
Utilities	

Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connection to centralised energy supply
HVAC:	district heating; Klimaaktiv certificate (gold level) for using mineral wool for thermal insulation Low energy building
Solid waste management:	connected to local waste management system
Implementation data	
Implemented?	Yes
Year of construction:	2017
Designer:	trans city ZT gmbh
Client:	KALLCO Bauträgergesellschaft m.b.H
Executing company:	Bulding is owned by Kallinger Grundverkehrs GmbH
Cost of construction:	€16,1 Million
Construction time:	1,5 years
Funding:	subsidized by the city of Vienna (loan with good conditions)
Plot ownership:	land owner: Kallinger Bauträger GmbH; residents are renting
PUE-related patents:	Slim Building Concept ® (Kallco)
Life cycle aspects	
Expected time of PUE on-site:	10 years (at least)
Reversibility:	”easy to remove” due to lightweight construction of some parts
Planned reuse/recycling:	units or materials can be reused somewhere else

Potential/planned secondary use concepts for TH-units:	can be used for student living or hotel
Adaptability:	parts of ground floor can be used differently according to the demands
Repurpose, reuse, new development of site/building:	not specified; building law permission for 15 years
Innovation aspects:	not specified; An essential element of the project is the principle of variable mixed use (hybrid use) of residential, commercial, and social uses, whereby living takes place only from the first floor. The ground floor areas can be modularly expanded at any time and thus replace or supplement subordinate serving uses such as storage and parking as needed.
Comments & references	
Additional comments:	the rent levels are socially feasible due to subsidization by the city of Vienna
Additional references:	https://derstandard.at/2000031304705/Stadt-Wien-will-Neubau-von-Wohnungen-auf-13-000-pro https://derstandard.at/2000079392608/Erste-temporaere-Wohnungen-in-Wien-werden-uebergeben http://www.kallco.at/kallco-innovativ#nclps-142 https://www.wohnberatung-wien.at/aktuelles/detail/news/show/wohnbau-offensive-stadt-wien-startet-sofortprogramm/ https://www.bauforum.at/architektur-bauforum/wohnanlage-home-21-wohnen-mit-system-trans-city-architekten-158080

Image 45: https://trans-city.at/tc/portfolio/siemensstrasse/

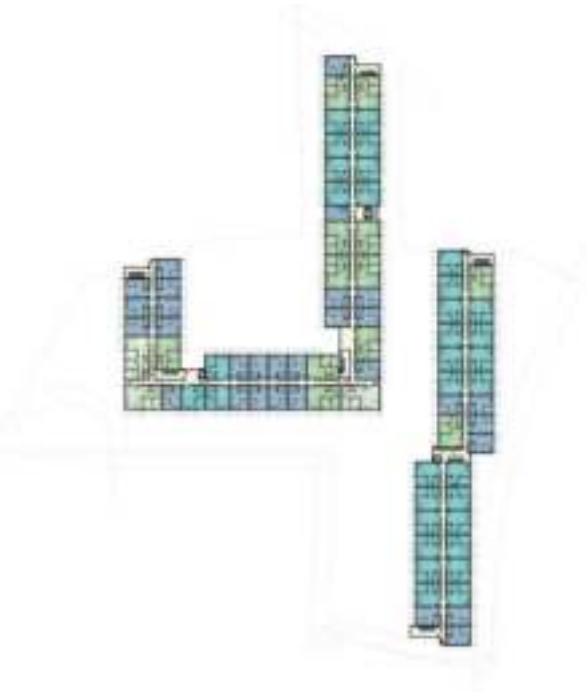


Image 46: https://trans-city.at/tc/portfolio/siemensstrasse/

22. HOLZMODULE PODHAGSKYGASSE

Project website:

www.google.com

Image 47: https://wohnservice-wien.at/aktuelles/aktuelles-detail/news/jetzt-anmelden-22-podhagskygasse/

Image 48: https://www.hirschstetten.info/beitrag.php?hid=1774

Project description:

“The project is being built in wood module construction and consists of seven buildings, which are offset from each other, with a total of 100 subsidized rental apartments for temporary living.” (Source: Wohnservice)

Particularities of the Project:

development on area with building ban (Source: Wohnberatung 2)

User specific aspects	
User groups:	singles, families social housing: residents with Wohnticket (Wohnberatung) according to FPö, 50 apartments should be reserved for asylum seekers. (FPOE) - Note: uncertain if that was only a plan or whether this was realized
Drivers/triggers:	high demand of rapidly available living space
Social mix & cohesion:	not specified; residents with Wohnticket living in area of single family houses
Location and environment	
Location:	Podhagskygasse (14?), 1220 Vienna, Austria

	48.2409 16.4951 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Continental
Physical properties	
Site type:	area with building ban according to §8
Plot area:	5.220 m²
Construction type:	prefabricated wooden modules, prefabricated unit modules (“industrially prefabricated room cells”); see Image 49 (Source: Der Standard)
Building type:	building (more than 2 units per building)
Weather resistance:	not specified; assumption: according to legal demands
Equipment & facilities:	bathroom; kitchen can be additionally rented: 0,66/m²
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood among others
No. of buildings:	7
No. of residential units:	99
Storey count:	2, 3 or 4
Integration of recreational and/or productive opportunities:	garden/terraces in the units on ground floor; high raised beds for urban gardening, laundry room, community space, playground
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connected to local network

HVAC:	individual electrical heating and infrared panels
Solid waste management:	connected to local network
Implementation data	
Year of construction:	2017
Client:	Siedlungsunion
Executing company:	Schmid Baugruppe
Cost of construction:	construction: €1350/m²; rent: €7,49/m²
Funding:	subsidized by City of Vienna
Construction time:	planned: 1 year; planned delivery: November 2017
Life cycle aspects	
Expected time of PUE on-site:	end of 2020 (Source: Hirschstetten)
Comments & references	
Additional comments:	Connection to neighbouring buildings: probably detached but can't tell yet; not shown on the pictures no elevator in the buildings
Additional references:	https://www.wohnberatung-wien.at/aktuelles/detail/news/show/wohnbau-offensive-stadt-wien-startet-sofortprogramm/ https://www.hirschstetten.info/beitrag.php?hid=1774 http://www.schmid-baugruppe.at/news-detail/schmid-holzbau-smart-fertig-wohnbau-offensive https://derstandard.at/2000081444440/Mehr-oder-weniger-temporaeres-Wohnen http://www.siedlungsunion.at/neuigkeiten https://www.fpoe-wien.at/news-detail/artikel/keine-temporaeren-wohnbauten-in-der-donaustadt/

Image 49: https://www.derstandard.at/story/2000081444440/mehr-oder-weniger-temporaeres-wohnen

23. LIFESHELTER

Project website:

http://www.realreliefway.com/en-us/life-saving-products/habitat/lifeshelter%C2%AE/shelters

Image 50: https://www.lifeshelter.com/family/

Image 51: https://www.lifeshelter.com/family/

Project description:

“Lifeshelter Family is a shelter solution with an 18 m2 floor area, and is complying to the UN standards for recommended minimum living area for a family of 5 people. It has an expected life span of 15+ years, and can be assembled by 2 people in 3-4 hours. It is well-suited for use in both hot and cold climates.”

Particularities of the Project:

easy to construct, resistant and reusable

User specific aspects	
User groups:	affected by disasters
Drivers/triggers:	natural disasters, hazards
User experience:	“After moving to this shelter, we no longer feel that we are refugees living in tents. It feels more like living in a real house.” (Source: Syrian Refugee in Northern Iraq) “Evaluation studies have shown that the refugees and internally displaced people living in our shelters were generally very satisfied with the functioning, comfort, safety and liveability of Lifeshelter.” (Source: Lifeshelter)
Location and environment	

Location:	Nduta Camp (Tanzania) -3.6950 30.7824 [Show on map]
Surrounding environment:	Rural environment
Climate:	Tropical
Physical properties	
Foundation type:	not specified; assumption: none
Weather resistance:	Fully fire retardant, Waterproof, Rot-proof, UV stabilised
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ Panels: stone wool insulation boards reinforced with steel ○ Endwalls: Stone wool insulation boards reinforced with steel ○ Doors: Aluminium and polycarbonate ○ Floor frame: Galvanized steel ○ Roofing: PVC tarpaulin or bitumen roofing felt
Storey count:	1
No. of persons per unit:	up to 5 persons
Built area:	18 m²
Area per person:	3,6 m²
Utilities	
Water supply:	Assumption: the PUE is doesn't have any water system
Sanitation system:	Assumption: the PUE is doesn't have any waste water system
Electricity:	supply not specified; pictures show that they have light and plugs
Implementation data	
Implemented?	Yes

Year of construction:	2016
Designer:	Evershelter ApS
Executing company:	“We strive to promote sustainable economic growth, productive employment and decent work in the countries we are working in. Refugee host countries often face severe economic challenges, and we recognize that the above-mentioned factors are crucial to create conditions that allow the local communities to become more resilient and independent of aid, and eventually lift them out of poverty. Instead of making explicit donations, our business model is designed as an income-generating project that ensures a more viable and sustainable social impact.” (Source: Lifeshelter)
Construction time:	3-4 hours / 2 people; “Rapid assembly without tools, Minimal use of materials due to optimized design” (Source: Lifeshelter)
PUE-related patents:	Lifeshelter® is a patented and registered concept. (Source: Lifeshelter)
Life cycle aspects	
Expected total life time:	15 years at least
Planned reuse/recycling:	the parts can be reused (16 panels, solid end walls) or recycled: “When Lifeshelter is no longer needed, it can be disassembled, and the panels can be straightened and reused for energy-upgrading regular buildings.” (Source: Lifeshleter)
Adaptability:	adding panels you can create a longer shelter; “Meets a wide variety of shelter needs, Modular design allows components to be ideally configured for homes, schools, medical facilities etc.”
Comments & references	
Additional comments:	easy to transport: 38 shelters enter in one container (40ft)
Additional references:	https://www.lifeshelter.com/family/ https://worldofcamps.org/camp/nduta-camp-english/

Image 52: https://www.lifeshelter.com/family/

24. REFUGEE SHELTER BALUKHALI II

Image 53: Julia Zeilinger

Image 54: Julia Zeilinger

Project description:

Starting late August 2017, there was a huge influx of people fleeing violence in Myanmar. In the Cox's Bazar area (Bangladesh), a makeshift refugee camp was installed. Families mainly live in (tent-like) shelters, with bamboo constructions and tarpaulin under harsh conditions. Note: A member of the POP-UP research project, visited the camp. Below, she reports her personal findings.

Particularities of the Project:

Makeshift family shelters with high risk of not withstanding worsening weather conditions (approaching monsoon season) and poor siting (prone to landslides) due to huge influx of people fleeing violence from neighboring country.

User specific aspects	
User groups:	People fleeing from violence in the Rakhine state (Myanmar). Legal status: stateless persons.
Drivers/triggers:	Violence in the Rakhine state in Myanmar mainly targeting the muslim ethnic group of Rohingyas.
Social mix & cohesion:	Main ethnicity: Rohingya, predominantly Muslims. Inner cohesion of user groups was allegedly quite good, as former village structures partly remained intact. Camp sectors had mayorlike decision makers ("Marsis") who had official functions in the village structures back in Myanmar. Own observations / assumptions: o many widows & orphans, as many men were killed when violence broke out in August 2017

	○ number of people fleeing from violence outweighs the host community (land of refugee camp was formerly a natural park with few Bangladeshi farmers)
Gender-sensitive aspects:	The refugee camp offered specific areas for different groups (e.g., child-friendly spaces, elderly-friendly spaces, women-friendly spaces), where the special needs of those groups were addressed (e.g., by offering playgrounds, schools, nursing lessons, social workers specialized on the needs of those groups). Many women fleeing from violence were targets of sexual assault or rape and arrived in the refugee camps pregnant and highly traumatized. There were “widows’ houses”, where only female residents (babies and small children excluded) were allowed and support by social workers, midwives, etc. was given to women by female staff only.
Location and environment	
Location:	Balukhali II refugee camp, Cox’s Bazar Area, Bangladesh - There are no exact addresses in the camp, but zoning and sectors. 21.1706 92.1477 [Show on map]
Surrounding environment:	The refugee camp was erected at a former natural park (rural area). By now, there is almost no vegetation left (space was needed for shelter, wood was needed for cooking and heating). With a population explosion of 0 in August 2017 to about 1mio in Feb. 2018, it is now more an urban area, however still lacking almost all of necessary basic infrastructure (road access, electricity, sanitation, safe water, ...)
Type of setting:	mainly formal: There is a registration system for incoming refugees and a system of allocation to available sectors in the refugee camp. Shelter NGOs support construction and material procurement in the camp. However, with a refugee camp of that size (700.000-1.000.000 people), there are lots of informal activities, too.
Climate:	approx. 20 m
Sea level:	Tropical
Physical properties	
Site type:	formerly green field (natural park with light to medium bush and forest cover)

Plot area:	Housing units I've visited were about 4x4m (room height: about 1.8-2.2m), sometimes larger, sometimes smaller. (Note: Those are personal estimates).
Construction type:	On-site construction of bamboo shelters covered with heavy-duty tarpaulin.
Foundation type:	Soil is piled up and compacted in order to form an elevated platform - this helps with drainage and mitigates the risk of the shelter units being flooded. For the bamboo poles, holes are dug and coated with soil as anchoring.
Building type:	building (more than 2 units per building)
Weather resistance:	Unclear, as the first monsoon season for the camp site has not arrived yet.
Equipment & facilities:	Household facilities often included a clay stove, water jugs and buckets and storage containers for food. A woven map was placed directly on the soil floor at night as a bed, with a mosquito net hanging from the ceiling (at daytime the mosquito net was attached to the wall for more space in the shelter unit). Few had basic furniture (such as a self-made shelf or plastic "camping-like", stackable chairs). Washing facilities, latrines and water points were located outside of the shelters at community level (if at all available).
Connection to neighboring buildings:	All types are found. Often more than one unit is attached to each other in order to use long bamboo poles as gable for various units. It is also a question of available space. Small alleyways are often only available after a plot of 3-10 housing units (of various length).
Materials used:	bamboo poles (different diameters), tarpaulin, bamboo yarn, bamboo wattling, plastic ropes
No. of buildings:	Unknown. There is a great quantity of shelter units in order to host around 1mio people.
Storey count:	1
No. of persons per unit:	Details unknown. Usually they are inhabited by families / extended families (at least those who made it to Bangladesh).
Built area:	not really applicable
Integration of recreational and/or productive opportunities:	Some shelter plots consisted of detached shelter units for individual families and one bigger tent with open walls (better draft against heat, roof for shade) for community meetings, cooking, general exchange and main location of women to spend their days. The alleyways were often used by children

	for playing. On community level there were sometimes indoor playgrounds, schools, small shops, etc.
Utilities	
Water supply:	usually community hand-pumps (high faecal contamination), surface water (very high faecal contamination), or deep boreholes (moderate to no faecal contamination). Aquatabs™ (chlorine water purification tablets) were distributed (including training) to facilitate household water treatment.
Sanitation system:	Sanitation services were in very poor condition. Usually there were community pit latrines, however there was no solution for faecal sludge management once the pits were full. For showering shared washing rooms are used, where you wash yourself with the help of a bucket or watering can
Electricity:	If any: mainly car batteries. Sometimes solar panels were installed on the roof, however due to dusty conditions they had to be cleaned all the time.
HVAC:	Unknown. Assumption: none at all. Sometimes clay stoves are located inside of the shelter units, sometimes they are located outside. Inside use poses a high risk for fire and indoor air pollution. (see left side corner of Image 57)
Solid waste management:	basically non-existing. There was lots of littering and indication of waste burning. Livestock (e.g., goats) were wandering through the camp eating all they could find (both organic waste and plastic waste).
Weather resistance:	Tents tend to heat up a lot in dry season. There is a high risk that the shelter units will not withstand the monsoon season (winds and rain might damage the tarpaulin roofs - water pockets will be formed in the tarpaulin pouches, where the material is not tightened enough. Poor drainage systems might result in severe soil erosion (risk of landslides burying the shelter units) and flooding of the units.
Implementation data	
Designer:	Unknown. (Construction guidance was given for example by Cluster Shelter Bangladesh)
Client:	Unknown. Assumption: NGOs, Bangladeshi officials(?)

Executing company:	Assumption: Both shelter experts (NGOs), local craftsmen and beneficiaries are involved in construction.
Funding:	assumption: donations / relief funds. Unknown if residents have to pay at least a small nominal fee.
Construction time:	Assumption: few days (with maybe 3-5 workers)
Plot ownership:	Unknown. Assumption: State owned land (as it was a former natural park)
PUE-related patents:	Assumption: None
Life cycle aspects	
Expected time of PUE on-site:	As the fate of the people fleeing from violence is unclear at the moment, there is no way to determine how long the refugee camp will be in place. Assumption: Balukhali II might be in operation for many years.
Expected total life time:	There is a risk that many shelter units might not be able to withstand the monsoon season.
Reversibility:	The natural park can never be returned into its original state, as almost all the vegetation was cut down and used for fire wood. Whole hillsides were dug off to get sand (needed for cement in high amounts). The shelter foundations might not be the biggest problem in terms of reversibility but the face of the landscape will be changed forever.
Planned reuse/recycling:	The tarpauling is likely to be worn out rather soon. Bamboo poles can potentially be reused, however, unknown if there are plans for this.
Potential/planned secondary use concepts for TH-units:	Assumption: None.
Use of reused/recycled materials during construction:	Unknown, where the building material comes from. However, there is an enormous demand for bamboo poles (which have to come from somewhere. - I see a risk that this is connected with major environmental impacts at the place of origin as the bamboo is cut down there in huge numbers). Thus, recycled materials would be nice to have, however I assume all the materials are virgin materials.
Adaptability:	The shelter units follow basic design guidelines, however, they are still quite adaptable. Some families included small shops (see Image 58) or gardens in their shelter units or adjacent land.

Comments & references	
Additional comments:	As there was no other land available for such large numbers of people, a former natural park, home for many animal species (including elephants) was repurposed for the refugee camp. As the elephants' migratory trails are crossing the refugee camps there have been various incidents of elephants trampling people to death at night when they are trying to use their old trails.
Additional references:	https://www.humanitarianresponse.info/ https://odihpn.org/magazine/eye-storm-responding-emergency-within-emergency/

Image 55: Julia Zeilinger

Image 56: Julia Zeilinger

Image 57: Julia Zeilinger

Image 58: Julia Zeilinger

Image 59: Julia Zeilinger

25. NADER KHALILI & CAL-EARTH EARTH BUILDINGS

Project website:

https://scholarcommons.scu.edu/cgi/viewcontent.cgi?article=1055&context=ceng_senior

Image 60: https://www.greenprophet.com/2011/12/nader-khalili-earth-buildings-space/

Image 61: https://blog.toploc.com/blog/mini-maison/maison-en-sacs-de-terre

Project description:

“The Built Earth Building shelters are made up of various sized sandbags that are filled with moistened earth so that the sand is more easily compatible. The sandbags are arranged in layers or long coils and wrapped with barbed wire and a stabilizer, such as cement, lime, or asphalt emulsion.”

“These shelters are extremely sustainable because they use mainly earthen materials and require no power tools or transportation. The sandbags used are synthetic low UV resistant and bio-degradable, so they will cause no harm to the environment after their use is up. The barbed wire that is used can come from a recycled source and can be recycled again if the shelter is ever demolished. Since the bags are most often filled with sand and dirt that are close to the site, there is no need to transport heavy building materials.”

“The domes can be built in one day with five to seven builders that were trained on site. These shelters can be covered with plaster for more long-term uses, or be left uncovered for temporary uses, such as a disaster situation. The only tools needed to construct one of these shelters are shovels and tampers, and the only materials needed are sandbags, soil, galvanized barbed wire, and water”

Chosen Case Study in Haiti: “After the devastating earthquake in Haiti in 2010, CalEarth was invited on a research trip to design a possible temporary housing alternative for individuals who lost their homes and were living in tent villages. After speaking with many families living in these camps, we returned a designed a structure based on their requests. As an alternative to our single dome designs, this structure includes a 10-foot main dome with 3 small apses, one for a sleeping nook, one for a cooking surface, and one for storage. It also includes a rocket stove, a recycled door made from pallets, and small window openings using PVC pipes. Two separate groups returned to Haiti and built multiple domes for families who lost their homes – see https://www.calearth.org/relief-initiatives for more information.” (Source: http://www.calearth.org/superadobestructures-calearth/)

Particularities of the Project:

- Structural success & disaster-proof design (earthquake, hurricane, flood & fire-resistant earth bags)
- extremely sustainable using earthen materials
- no power tools
- no transportation
- built in one day with 5-7 builders
- local, biodegradable & recycled materials
- affordable
- design adapted to requests of dwellers (prior research trip to communicate with those affected)

User specific aspects	
User groups:	refugees
Drivers/triggers:	architect was renowned for creating earth-based architecture with lunar and space applications –> application for post disaster such as earthquakes
Social mix & cohesion:	refugees (Haiti, Pakistan) children & caretakers (Nepal)
Gender-sensitive aspects:	not specified (but affordability is of particular importance for vulnerable groups)
Location and environment	
Location:	Port-au-Prince, Haiti; 18.5392 -72.3350 [Show on map] 10177 Baldy Lane Hesperia, California, United States: 34.4353, -117.3566 [Show on map] Furthermore: Baninajar Refugee Camp inChuzestan, Iran;
Surrounding environment:	Urban environment
Climate:	Tropical
Physical properties	
Site type:	Unknown

Plot area:	plot appears to correspond with built area
Construction type:	solid (sandbags & wires)
Foundation type:	None
Building type:	house (1-2 units per building)
Weather resistance:	extremely weather resistant so far as it is disaster-proof (against earthquakes, fires, floods & hurricanes) Proof: has survived an earthquake of magnitude 7.6 Structural tests were done in the 90s addressing live-load, dead-load, static and dynamic loading forces.
Equipment & facilities:	The Konbit Shelter website mentions designing a family home with a composting toilet. The Cal-Earth website mentions a cooking nook.
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ sandbags (synthetic low UV resistant & biodegradable) ○ barbed wire (from recycled source & recyclable) ○ soil ○ possible plaster covering ○ One source mentions 90% earth and 10% cement for Konbit Shelter in Haiti (https://inhabitat.com/konbit-super-adobe-shelters-are-helping-a-rural-haitian-village-rebuild/) ○ For cost information, see Image 63
No. of buildings:	not specified But in 2014 the Konbit shelter could boast public buildings and infrastructure such as: ○ community center with internet ○ connection (also used for schooling) ○ solar power system ○ a clean stove project (with students of the University of Illinois) (Source: http://konbitshelter.org/) Based thereon, the assumption can be made that the PUE must be large enough for a community
Storey count:	1
No. of persons per unit:	the Konbit Shelter website mentions designing an adapted cement-less family home for a family of 6. The design & size of units appears flexible.

Built area:	initially: 10 ft main dome with 3 small aspes (sleeping nook, cooking surface & storage) 10 feet = 3,048m –> more than 7 m² on the assumption that 10 ft is the diameter? Buildings appear flexible in design.
Integration of recreational and/or productive opportunities:	The Konbit Shelter website describes a community center as a place for schooling, learning and exchange: “the community center suggests the possibility of a free and public place of learning, a place where the knowledge, expertise and traditions of the community take center stage, and where inquiry can flourish”
Utilities	
Water supply:	not connected to centralised water supply system
Sanitation system:	not connected to centralised sewer system. The Konbit Shelter website mentions designing a family home with a composting toilet. It is to be assumed that this is not the case for all the units (it appears to be a later addition)
Implementation data	
Implemented?	Yes
Year of construction:	2010
Designer:	Nader Khalili
Client:	I don’t believe there was a commission
Executing company:	initiative started by Nader Khalili and continued by Cal-Earth
Cost of construction:	See example of cost sheet for Port-au-Prince (see Image 63). These costs do not include land or labour costs, but the projects are generally constructed based on free (volunteer) labour.
Funding:	Donations for project materials are made available through campaigns. (e.g., the Konbit Shelter Kickstarter Campaign, https://www.kickstarter.com/)
Construction time:	No transport needed for the main building materials.

PUE-related patents:	"Khalili patented a variant of earthbag building in 1999, trademarked "superadobe" (U.S. Patent 5,934,027, 3, 195, 445) using specially sewn long bags to create domed beehive-like structures.The system is "freely put at the service of humanity and the environment. Licensing is required for commercial use.", in a post-patent statement by Khalili, though it has been argued that the patent should never have been issued, since the process was highly publicized for a full year before the patent was applied for." (Source: https://enst.umd.edu/)
Life cycle aspects	
Expected total life time:	not specified, but durability is high and the Port-au-Prince shelter has been constructed for 8 years. The line between temporary and permanent appears to blur.
Reversibility:	Reversible.
Planned reuse/recycling:	Yes. "Recycling" of earthen materials.
Adaptability:	adaptability is low once built. But a lot of communication and feedback loops with inhabitants leads to changes in design.
Innovation aspects:	"These shelters were used in Port-au-Prince and surrounding cities after the devastating earthquake in 2010. These structures included a 10-foot main dome with three small apses for sleeping, cooking, and storage. A door was built out of recycled pallets, and small air vents were made using PVC pipes" "These shelters were also used in northern Pakistan after the October 2005 earthquake. The sandbags were distributed and hundreds of refugees were trained to build the shelters." "Over 40 domes were built in 2006 for children and their caretakers in the Pegasus Children's Project in Nepal, as seen below in Figure 50. These domes later survived the magnitude 7.6 earthquake in 2015 and all the inhabitants were safe and could continue living in the domes after the earthquake."
Comments & references	
Additional references:	Project diary from Port-au-prince: http://earthbagstructures.com/projects/johnson.htm Port-Au-Prince property rights : https://www.land-links.org/ Project facts: https://enst.umd.edu/ CalEarth website: http://www.calearth.org/superadobe-structures-calearth/

	https://inhabitat.com/konbit-super-adobe-shelters-are-helping-a-rural-haitian-village-rebuild/ http://konbitshelter.org/ https://www.calearth.org/relief-initiatives https://architectureindevelopment.org/project.php?id=48 https://www.akdn.org/architecture/project/sandbag-shelters Book: Earth Architecture. Ronald Rael. Princeton Architectural Press. New York, 2009. P. 182 [Show on Google Books]

Image 62: https://blog.toploc.com/blog/mini-maison/maison-en-sacs-de-terre

Image 63: Earth Architecture. Ronald Rael. Princeton Architectural Press. New York, 2009. P. 182

26. EMERGENCY SHELTER PRIMAVESIGASSE, VIENNA

Project website:

https://www.roteskreuz.at/news/datum/2017/03/03/winternotquartier-primavesigasse-schliesst-seine-pforten/

Image 64: https://www.roteskreuz.at/news/datum/2017/03/03/winternotquartier-primavesigasse-schliesst-seine-pforten/

Image 65: Julia Zeilinger

Project description:

In January and February 2017 Vienna was struck by a very harsh winter cold. Official homeless shelters in Vienna were overwhelmed by the numbers of people seeking warmth and refugee during the freezing cold nights. In order to not risking deaths from cold in the city of Vienna, officials requested (amongst others) from Red Cross emergency service to install and operate a temporary homeless shelter during the cold spell. A former administration building of Wien Energie in Wien-Donaustadt (Primavesigasse) which is currently unused was repurposed to provide a place to sleep and eat during the nights.

Note: A member of the POP-UP research project, volunteered in this housing project. Below, she reports her personal findings.

Particularities of the Project:

An existing building structure (Administration building of Wien Energie corporation) was temporarily used to address the pressing need of provision of additional sleeping places for homeless people who would otherwise sleep outside but would be risking freezing to death during a severe cold spell in Vienna in the beginning of 2017.

User specific aspects	
User groups:	homeless persons
Drivers/triggers:	Weather: persistent severe cold spell in Vienna
Social mix & cohesion:	Many of the person who used this emergency accommodation were citizens of Slovakia and other Eastern

	European countries. Allegedly, they were travelling to Austria because they hoped for better accommodation and support than in their home cities. There have been quite some frictions between different users, e.g., between different nationalities. Those conflicts were often fueled by high levels of alcohol, language barriers, the feeling of being treated unequally or disputes over distribution of bunk beds. As a last resort, aggressive persons were risking ban on entering the house. The location of the Primavesigasse building is quite remote, thus there were no direct neighbours.
Gender-sensitive aspects:	Not quite sure, if this emergency accommodation was “formally” for male persons only, however, not aware that also women were sleeping in the accommodation.
Location and environment	
Location:	Primavesigasse, 1220 Wien 48.1981 16.4616 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Temperate
Sea level:	158 m
Physical properties	
Site type:	developed field in industrial belt of Vienna
Building type:	This building was not built to be a house to live in permanently. It is a former training center, which offers conference rooms, canteen kitchen and dormitories. There are not apartment-like residential units in this building.
Weather resistance:	Good weather resistance and comfortable room temperatures.
Equipment & facilities:	The building was equipped with dormitories in different sizes (4 beds up to 12 beds), shared shower and toilet facilities, canteen kitchen (only the support team was allowed to enter. It was not allowed to use the kitchen equipment and dishes), dining hall (including table football facilities), office space (for support team), separate bedrooms for the support team.

Connection to neighboring buildings:	detached (free standing)
No. of buildings:	1
No. of residential units:	Does not really apply to this example. Maximum capacity of this emergency accommodation was 100 persons. There were rooms equipped with varying numbers of bunk beds (ca. 8-24 persons per room)
Storey count:	6, however, only 3 of them were used for emergency accommodation: Ground floor: canteen, 1st and 2nd floor: dormitories with bunk beds and shared bathrooms and toilets. (3rd-5th floor vacant. Access was restricted - locked doors)
No. of persons per unit:	Does not really apply to this example. One bed was allocated to each person.
Integration of recreational and/or productive opportunities:	None, this emergency accommodation was for sleeping only. It opened its gates only from 18.00-8.00. Persons who came on a regular basis were allocated to the same bed every night. All persons had to leave at 8.00 in the morning the latest and were referred to warm rooms and other facilities which would provide shelter from the cold during daytime.
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
HVAC:	Connected to local heating system
Solid waste management:	There was an arrangement with Viennese waste collection service to pick up the solid waste on demand (Support staff had to call waste collection service if needed). No waste separation was implemented. High volumes of waste were generated, as it was not allowed to use the dishes that were available on-site, but instead single-use plastic cutlery and plates were used.
Implementation data	
Implemented?	Yes
Client:	Fonds Soziales Wien

Funding:	PUE = temporary use of existing building. not sure about the financial details. Support staff were volunteers by Vienna Red Cross. The rest is most likely a mix of state funds (or by the City of Vienna) and donations.
Plot ownership:	Assumption: Wien Energie corporation, the owner/former tenant of the building.
Life cycle aspects	
Expected time of PUE on-site:	6 weeks (duration of cold spell)
Expected total life time:	The building itself has a long expected life time, as it is a permanent building.
Reversibility:	The building cannot be removed without leaving a mark, as it is a permanent building. The temporary use as emergency accommodation can be reversed quite easily. The office space is emptied, the dormitories cleaned, the beds receive protective covers, so at a later time, if it is needed again for temporary accommodation, it can quickly be reopened.
Planned reuse/recycling:	The equipment (bunk beds, furniture, etc.) will stay in the building, so if there is another crisis, it can again be activated as a temporary shelter quickly. However, during operation phase, there is no reuse / recycling at all: plastic dishes pile up day by day and also the hygiene kits have lots of packing materials which easily get littered in the showers or dormitories.
Potential/planned secondary use concepts for TH-units:	There is a high likelihood that this building will be reactivated for temporary emergency accommodation in the future unless Wien Energie will find a new permanent use for this building or decides to tear it down to make space available for a different purpose.
Adaptability:	The dormitories are of different size. There are smaller rooms which are more attractive for temporary residents as they offer more privacy and quiet. The majority of the rooms host around 20 bunk beds, which is a lot and also leads to conflicts (e.g., due to heavy snoring of some, which is annoying to others). This room division is not really adaptable.
Repurpose, reuse, new development of site/building:	The building was initially built for a different purpose (training center for Wien Energie staff). Wien Energie for the moment does not use the building at all, thus it was quick and easy to adapt to the higher demand of safe accommodation for

	homeless persons during the cold spell. It has also been used as a temporary refugee shelter before.
Comments & references	
Additional comments:	At registration, there were hand-outs for persons sleeping in the facilities: Hygiene kits (toothbrush, soap, shower gel), on demand: warm cloths, gloves, hats, socks, etc. (all donations from private people), in particular hardship: warm shoes (there were not many, thus not everyone could get a new pair). Persons who came on a regular basis did not receive a full kit every day but could ask for more, if they were running out. For dinner, hot soup, goulash or other one pot dishes were served. The building in Primavesigasse has been used before as temporary refugee center. However, it is not really very suitable for spending day and night there, as it gets easily crowded, there are not many community spaces / rooms and privacy is an issue. The connection to public transport is poor (as it is in a remote location) which makes it tricky to fulfill all necessary paperwork and attend to all relevant training courses, ... Also, the homeless persons were on edge during the nights because they were afraid of stuff being stolen from them by other temporary residents. Quite some were sleeping with their shoes on so they could not be stolen from them. Primavesigasse was operated from Mid-January to end of February. In this time almost 1600 overnight stays by 109 termporary residents were documented. The support team consisted of Red Cross volunteers and social workers. It is considered a success example of good cooperation between emergency services and Viennese Assistance to the Homeless.
Additional references:	https://www.roteskreuz.at/

27. WOHNCONTAINER PFARRE RODAUN

Project website:

http://www.pfarre-rodaun.at/med/med_bildergalerie_2015.html

Image 66: Pfarre Rodaun

Image 67: Pfarre Rodaun

Project description:

In Autumn 2015, there was a steep increase of refugees arriving in Austria, overwhelming official refugee accommodation structures.

The Community of the parish of Rodaun had an urge to help during this situation. A first idea to open the church itself as emergency refugee shelter (for 80-90 people) was declined but contact with Caritas was established. Caritas suggested to erect a container home for refugees on church property. The residents of this refugee shelter were unaccompanied minors, as Caritas was in urgent need to find accommodation for this group. The parish of Rodaun had a meeting, were all agreed to this temporary housing project and informed the neighbourhood. Caritas took care of planning, building permits and construction. Once the teens moved in, Caritas provided a 24h care and support service. The parish was quite involved too, running errands, organising German classes, accompanying the residents to doctor's appointments, helping out with new clothing, etc. This temporary housing project was originally limited to 2 years (with an option of extension), however, after about 15 months, Caritas decided to close down this facility, as the refugee numbers were going down, and in order to save costs, Caritas closed down temporary facilities and relocated the affected inhabitants to permanent Caritas facilities.

Particularities of the Project:

Good cooperation between Pfarrgemeinde (parish) Rodaun (made available the plot of land), Caritas (was in charge of care services) and beneficiaries (unaccompanied minors).

User specific aspects

User groups:	male unaccompanied minors (14–18-year-old boys). They were refugees or asylum seekers from different states (e.g., Syria, Afghanistan, Somalia, ...) Room occupancy changed, once the boys turned 18. Then they had to leave the facility and were had to relocate to facilities for adult men, resulting in much less support and care in unfamiliar surroundings.
Drivers/triggers:	Increase of refugees and migrants in the second half of 2015 resulted in overwhelmed support systems in all of Europe. In Vienna, there was a lack of refugee accommodation, thus this temporary housing facility was constructed in cooperation of Pfarre Rodaun and Caritas.
Social mix & cohesion:	The residents were teen boys only. A member of Caritas support staff was present at all times. There was a Caritas office and warehouse in the container facility, where Caritas staff could also sleep. One of the staff spoke Farsi, which was very helpful, especially in the beginning. There was a team of 4 church members who acted as link between the parish, Caritas and the teen boys to ensure good flow of information and quick response to urgent needs of the unaccompanied minors. The neighbourhood was informed about the temporary living containers and there were no complaints. Within the group of residents there were some conflicts or friction from time to time, e.g., amongst different nationalities. On one occasion, there police support was requested. One resident had to be banned from the facility and accommodated at a different facility. Within the residents and the community members of Pfarre Rodaun there were also some friction points: o The priest was also living on the church premise, and during the nights the residents were quite loud (music), which was a nuisance for the priest. o In the beginning, the residents were happy about all donations from the community. Over time, they became pickier (e.g., clothing was not “cool” enough) - This was not received well by the church community. o Once there was an incident were donated food items turned up in the waste bins (allegedly due to expired best before date) o It was not well received by the church community that there was so much smoking and playing on the mobile phones all the time.
Gender-sensitive aspects:	The residents of the housing containers were male unaccompanied minors only.
User experience:	It was reportedly quite hot in the containers during the summer months. There were space constraints, resulting in later addition of two container elements (used as additional

	warehouse and area for Caritas). There was concern it could be too cold in winter, but this didn't come true.
Location and environment	
Location:	Schreckgasse 19, 1230 Wien 48.1376 16.2648 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Temperate
Sea level:	238 m
Physical properties	
Site type:	developed field
Plot area:	area of plot: 1736 m2. On site there are the church and rectory. The adjacent sports field is part of the plot, too.
Construction type:	Standard construction cabins (containers) with inner surface of 14 m². First, 12 containers were assembled to form one building, later 2 additional container modules were attached. The container modules were placed on concrete strip foundations. The layout of the container building was as follows: There was a central aisle between the container modules, there were ○ 8 container modules as living units (2 beds, cupboard, table), ○ 2 container modules as combined kitchen and living room (including washing machine with tumble dryer), ○ 1 container module with wet cells (showers and toilets), ○ 1 container module for Caritas staff (office, sleeping space). Later there were 2 more containers attached for Caritas (warehouse, office). The aisle would have needed more space.
Foundation type:	Concrete strip foundations were constructed prior of assembly of container modules (to allow hardening)
Building type:	building (more than 2 units per building)

Weather resistance:	In summer, it was quite hot in the containers. In the beginning, after construction rain leaked into the containers, this was later fixed. The floor was cold, thus carpets were requested. However, the carpets were removed again, as the authority banned it due to risk of fire. Curtains were not allowed for the same reason.
Equipment & facilities:	Sleeping rooms were equipped with 2 single beds, (lockable) lockers, and table. It was a decision by Caritas not to use bunk beds but single beds instead. Socket outlets to recharge the mobile phones. The kitchen / living room was equipped with washing machine (incl. tumble dryer), 2 stoves, dishwasher, microwave, fridge, WiFi, television, fire extinguisher. Basic foodstuff was provided by Caritas. The residents had to cook for themselves. Special ingredients had to be bought by themselves or being organised by parish (who provided food vouchers) The bathroom container was equipped with 2 shower cubicles, 2 toilets, 4 sinks, 2 urinals Caritas office was equipped with printer, fax, computer. Caritas supplied all basic furnishing. Supplied by Pfarre Rodaun (on request of residents): old laptops, toaster, wall clock. A sewing machine was requested in particular by one resident. Personal lockers, rooms and container building was lockable. Pfarre Rodaun provided some additional rooms in the rectory for team meetings of Caritas staff and / or church community, German classes, etc.
Connection to neighboring buildings:	detached (free standing)
Materials used:	standard containers, concrete foundations
No. of buildings:	1
No. of residential units:	8 units in containers, with 2 beds per unit. However, there was a maximum capacity of 15 persons allowed, so one room was used as single room, whereas all the others were used as double rooms. The reason for this is organisational, as 15 beneficiaries is the maximum number for one caritas support staff. If there would have been more than 15 persons, it would have been necessary to have a second support staff on site all the time - thus it was a question of funding. The allocation of rooms was a potential of conflict - there were also conflicts amongst different nationalities. Reallocation of rooms was a measure to resolve conflicts.

Storey count:	1
No. of persons per unit:	2 persons per living unit (= 1 container module)
Built area:	The container building had dimensions of 14,7m x 14,6m, thus the built area was 214 m².
Area per person:	14,26 m2 per person (214 m2/15 persons). Private space (in shared bedroom) was 7 m² (14 m² per container module/ 2 residents)
Integration of recreational and/or productive opportunities:	In the beginning, the residents slept a lot and cried a lot due to stresses endured during their flights and journey. Pfarre Rodaun tried to support the teenagers with leisure activities. On site activities: o Pfarre Rodaun organised German classes with volunteers of the parish. o football matches on church-owned sport field o gardening opportunities were provided; however, the residents were not too much into it o The beneficiaries were allowed to use the youth rooms in the rectory at given times. There they could organise parties (and invite friends), play table tennis and table football o watching TV and listening to music (on mobile phones) o The residents organised a “Pfarrcafé” Neighbourhood activities: o The parish organised shopping vouchers for a nearby shopping centre Riverside (mostly for clothing) o The stream Liesingbach was in close proximity to the living containers and offered a retreat. o Pfarre Rodaun organised a bike for every resident, however, some owners didn’t treat them well and soon some bikes were broken (which upset some parishioners). Others took good care of the bikes and used it for daily errands. o The residents were invited for dinner by individuals from the parish off-site activities: o Pfarre Rodaun equipped the residents with tickets for sport clubs / fitness center. o Trips with community volunteers to go swimming, ice skating, bowling o vacation in summer with all residents to Mariazell (hiking, rowing, raft building) special events:

	○ the residents were invited to the Pfarrball (“parish prom”), where they were very amused to see Austrians dancing. In general, the residents liked dancing and were good at it.
Utilities	
Water supply:	Connected to centralised water supply system. There was a water meter installed for the living containers, Caritas paid for consumption.
Sanitation system:	Connected to centralised wastewater system. Once there was a problem with waste oil, which ended up in the sink and blocked the drain. There were considerations for installing a grease separator, but in the end, it was not installed.
Electricity:	There was a separate power line installed for the living containers.
HVAC:	Electric radiator, that provided sufficient ambient temperature. A separate electricity meter was installed, Caritas paid for consumption.
Solid waste management:	Organic waste, glass, paper, plastic bottles, residual waste containers. The plot was supplied with additional containers, as there was more waste generated due to the living container. This was paid for by Caritas
Implementation data	
Implemented?	Yes
Year of construction:	Autumn 2015
Designer:	Caritas developed the building plans.
Client:	Caritas
Executing company:	Unknown (Caritas commissioned a construction company)
Cost of construction:	Unknown
Funding:	Caritas + private donations
Construction time:	1 day for foundation construction, waiting period for hardening, 1 day for container construction. Half a day for assembling of furniture (by community volunteers of Pfarre

	Rodaun). (In total approx. 2 months from the beginning of construction to the date, were residents moved in).
Plot ownership:	Pfarrzentrum Rodaun (now "Pfarrverband KaRoLiBe“)
Life cycle aspects	
Expected time of PUE on-site:	2 years, with option for extension. However, after 15 months (January 2017) Caritas decided to close down the facility (see above). The decision for closing down the facility was made by Caritas most likely due to cost-efficiency considerations. The decision was made quick and was a surprise for the church community.
Reversibility:	Foundations were removed by excavator and carted off (construction waste). The plot was returned to its original state, regrowth of grass. Today, no traces of the living containers can be seen anymore. (This was a precondition by Pfarre Rodaun, that the plot could be returned to its original state.)
Planned reuse/recycling:	There was a reuse of the container modules, however, details are unknown.
Potential/planned secondary use concepts for TH-units:	Containers are supposedly reused.
Use of reused/recycled materials during construction:	Prior to being a living container, the container modules were used as school containers.
Adaptability:	Floor plan was pre-set due to container walls. However, there were additional modules attached to the container building, as there was a need for more space.
Repurpose, reuse, new development of site/building:	The plot where the living containers were built on were a green area on the church-owned plot before. The containers were used as school containers before.
Comments & references	
Additional comments:	All pictures are owned by Pfarre Rodaun. Additional services provided by church community: o many efforts to make it possible for the residents to visit local schools and ongoing support (in case of conflicts in schools, attendance at parent-teacher conference, ...)

	○ support for doctor's appointments. Especially in the beginning, many residents had severe problems with their teeth. Also visits at ophthalmologists and to hospital (due to broken leg) ○ As Caritas provided only one person for support, the church community pitched in whenever there was additional support needed.

Image 68: Pfarre Rodaun

Image 69: Pfarre Rodaun

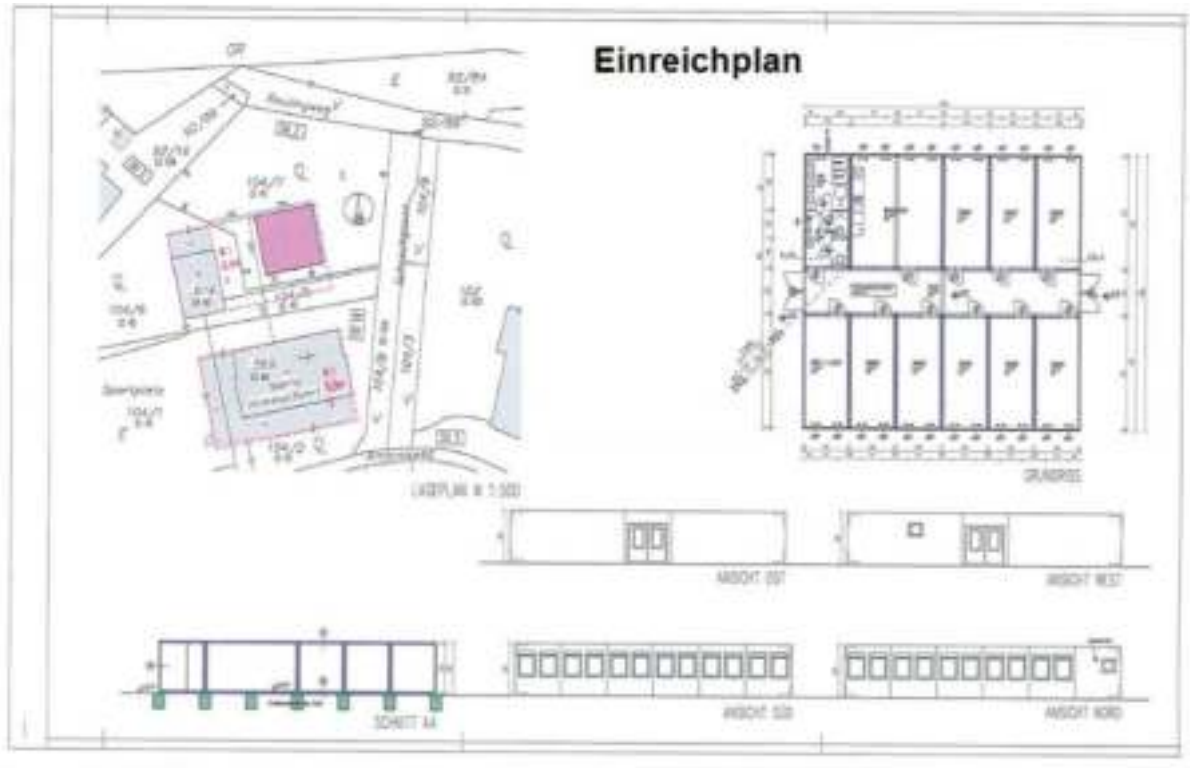


Image 70: Pfarre Rodaun

28. BASE CAMP OF FIELD HOSPITAL IN BALUKHALI II, BANGLADESH

Project website:

www.google.com

Image 71: Julia Zeilinger

Image 72: Julia Zeilinger

Project description:

Due to the influx of people fleeing from violence in Myanmar, a refugee camp was erected in the region of Cox's Bazar in Bangladesh. A field clinic was operated by Scandinavian staff in cooperation with local health workers. Due to the fact that the field hospital was open 24/7, a base camp for (expat) hospital staff was erected, comprising of a fenced area for sleeping tents and community space (including washing facilities, field kitchen, cafeteria). Local auxiliary staff (such as drivers and security) had a separate area with less comfort. For patients, there were various operating rooms, ERs, x-ray facilities, laboratories, outpatient clinics and limited room for inpatient treatment. All of them were located in tents.

Particularities of the Project:

This is an example of expat accommodation under field conditions. In comparison to the temporary housing units in the refugee camp, the base camp of this field hospital was rather high in comfort, equipment, and facilities.

User specific aspects	
User groups:	(foreign) nurses, doctors, medical staff who were in charge of running the field hospital. Mainly from Scandinavian countries. (e.g., expats / Employees who require short-term accommodation) Local staff had the possibility to sleep at home.

Drivers/triggers:	Lack of medical support in Balukhali II refugee camp close to the border of Bangladesh and Myanmar required establishment of local health points and clinics. The field hospital operated by Bangladesh Red Crescent, Norwegian Red Cross and Finnish Red Cross was built to address this urgent need. As the hospital had to be operational 24/7, the plot was sectioned, to allow erection of a base camp, where (mainly foreign) health workers (nurses, doctors) were living and recovering in their free time.
Social mix & cohesion:	The field hospital was jointly run by Bangladesh Red Crescent, Norwegian Red Cross and Finish Red Cross. Foreign staff originated mainly from Scandinavian countries. Residents of the hospital's base camp were mainly expats, as the local staff returned to their homes for sleeping. The field hospital was located at the border to the refugee camp, right next to the main street and the whole area of the hospital was fenced and guarded for security reasons and to prevent animals entering the plot. The field hospital was well respected and appreciated by the local community.
Gender-sensitive aspects:	There are no specific gender-sensitive aspects in the base camp worth mentioning (gender-separated latrines and showers). However, due to local culture, the patients were treated in gender-separated treatment areas / surgeries and by either male or female health workers. An obstetric ward / maternity ward is part of the field hospital.
User experience:	Living in the field hospital's base camp is exhausting (due to high-stress working environment in the field hospital and low living standard).
Location and environment	
Location:	Balukhali II refugee camp, Cox's Bazar Area, Bangladesh - There are no exact addresses in the camp, but zoning and sectors. 21.1706 92.1477 [Show on map]
Surrounding environment:	The refugee camp was erected at a former natural park (rural area). By now, there is almost no vegetation left (space was needed for shelter, wood was needed for cooking and heating). With a population explosion of 0 in August 2017 to about 1mio in Feb. 2018, it is now more an urban area, however still lacking almost all of necessary basic infrastructure (road access, electricity, sanitation, safe water, ...)

Type of setting:	formal setting
Climate:	Tropical
Sea level:	approx. 20 m
Physical properties	
Site type:	formerly green field (natural park with light to medium bush and forest cover)
Construction type:	sleeping tents: Prefabricated off-the shelf tents for approx. 2 persons. (outer layer: common plastic tent fabric) community area / community kitchen: bamboo construction with prefabricated corrugated iron roof
Foundation type:	Tent pegs and rope
Weather resistance:	Medical staff lives in tents, which are supposedly watertight. The shared spaces are located under shed roofs (e.g., kitchen, eating area), which offers no protection against side winds and rain on all sides. While erecting the field hospital, good drainage was a focal point: drainage channels were dug and the whole plot was gravelled in order to prevent stagnant water or over-flooding in case of severe rains (e.g., during monsoon season).
Equipment & facilities:	shared showers (gender-separated), shared pit latrines (gender-separated), shared washing machine and tumble dry, shared field kitchen (with fridge, stove, storage facilities), shared (shaded) eating space, also used for leisure time.
Connection to neighboring buildings:	detached (free standing)
Materials used:	sleeping area: prefabricated tents, community area: bamboo poles, corrugated iron roof
No. of buildings:	Approx. 50-60 sleeping tents for expats. Additional tents (lower comfort, more persons per tent) were provided for (local) auxiliary staff (e.g., drivers, security)
No. of residential units:	Exact number unknown. 50-60 sleeping tents for expats. + additional tents for (local) auxiliary staff
Storey count:	1

No. of persons per unit:	Assumption: 1-2 per sleeping tent. (The tents are separated with a central section into two sleeping corners, to ensure minimum standard for privacy. If delegates live in the base camp for more than 3 months, they get a double tent for themselves alone.)
Area per person:	Unknown. Assumption: 2-3 m2 in sleeping tent per person. Additional space (eating area, field kitchen, bathrooms) was shared by all residents.
Utilities	
Water supply:	bottled water is used for drinking and cooking. An MSF water tanker delivers water for other purposes on a daily basis. Only in the summer months of 2018 the system changed, and the field hospital commissioned a drilling company to develop an on-site deep well)
Sanitation system:	pit latrines
Electricity:	diesel generators for electrical power supply
Solid waste management:	Waste incinerator for medical waste. (Edit August 2018: In the meantime, a basic waste management system has been implemented. There are 5 waste categories: plastic bottles (to be sold), metal waste (to be sold), organics (a waste pit was implemented at the premise), medical waste (gets incinerated), other waste (plastic sheeting, etc. - gets incinerated).
Implementation data	
Implemented?	Yes
Year of construction:	2017
Executing company:	Tents were set up by Norwegian Red Cross / Bangladesh Red Crescent / Finish Red Cross.
Funding:	Donations
Construction time:	Unknown. According to social.shorthand.com, it took weeks. Assumption: Field hospital equipment was delivered by airfreight from Europe when field hospital was deployed (few days for delivery). Tents were most likely part of this material

	delivery. The site development (levelling, gravelling, drainage, etc.) might have taken some days.
Plot ownership:	Not specified. Assumption: State owned land (as it was a former natural park).
Life cycle aspects	
Expected time of PUE on-site:	As the fate of the people fleeing from violence is unclear at the moment, there is no way to determine how long the refugee camp will be in place and how long the field hospital will be needed. Assumption: Balukhali II might be in operation for some years.
Reversibility:	The natural park can never be returned into its original state, as almost all the vegetaion was cut down. The plot of the field hospital is gravelled, which would have to be removed.
Planned reuse/recycling:	The tents might be reused after the deployment (if they are not worn out). Assumption: The tents might stay in Bangladesh after the deployment as the costs of bringing them back to Europe will exceed the benefit of reusing them. If the tents have to withstand wet weather for prolonged time periods, mold might be an issue.
Potential/planned secondary use concepts for TH-units:	Sleeping tents might be reused again as tents in another situation.
Use of reused/recycled materials during construction:	No
Adaptability:	The sleeping tents are prefabricated and cannot be adapted. There is the possibility to erect more tents if there is more staff needed in the field hospital.
Comments & references	
Additional references:	https://social.shorthand.com/ https://fieldhospital360.com/?lang=en

Image 73: Julia Zeilinger

Image 74: Julia Zeilinger

29. URBAN RIGGER™

Project website:

http://www.urbanrigger.com/

Image 75: http://www.urbanrigger.com/

Image 76: http://www.urbanrigger.com/

Project description:

Shipping containers become floating dorms for students. A Copenhagen start-up developed this student dormitory, where the containers are based on concrete pontoons and stacked in 2 levels to create 12 dorm rooms.

There are solar panels (PV) installed and hydrosource-heating is used for cooling and warming the dorms. It's a zero energy building. The first full scale URBAN RIGGER was delivered in the summer 2016 in Copenhagen, as the first in a potential fleet of mobile, sustainable dwellings, for students, refugees and others, in urgent need of a home.

Particularities of the Project:

water-based housing option. Urban Rigger flows on the water and is thus not a real estate.

The temporal factor is not the key aspect of the concept. The Urban Rigger can easily be conceptualised as permanent. However, it was included in this database anyway, as it matches some other project criteria: It is designed for students, the main driver was lack of affordable housing, it makes use of former unused area in the city (water in harbors) and sustainability is a key feature of the design. Yet, on the homepage it is called in one instance: "mobile, sustainable dwelling"

User specific aspects	
User groups:	students "Right now, the focus is student accommodation, but the possibilities are endless. Small hotels, youth hostels, educational institutions, sheltered housing for the elderly –

	and particularly in the current climate: housing for refugees. And the advantage with Urban Rigger is that it can be relocated if needs change”
Drivers/triggers:	Lack of affordable living options for students in Kopenhagen (being amongst the ten most expensive cities in the world to live in) + Lack of affordable living options for students in other university cities in Europe
User experience:	Not specified. “As a student on a Urban Rigger, you literally live on the water, which can sometimes be felt, even though the structure with its more than 600 tons is fairly stable.”
Location and environment	
Location:	Refshalevej, 1432 Refshaleøen, Denmark 55.6905, 12.6086 [Show on map]
Surrounding environment:	harbor - urban rigger is floating on water
Type of setting:	formal
Climate:	Continental
Sea level:	0 m
Physical properties	
Site type:	harbor. “According to local plan No. 209, Refshaleøen is designated as a perspective area, which means that the area can only be developed when the plan period expires. According to the Planning Act, it is possible to build temporary study housing in the municipalities’ perspective areas for up to 10 years. This is the opportunity that Udvikling Denmark A / S makes use of. There is therefore a requirement that only students are living on Urban Rigger.”
Plot area:	680 m²
Construction type:	prefabricated shipping containers floating on water on a pontoon base made of concrete
Foundation type:	“This student dormitory floats on water. The containers are based on top of a concrete pontoon base and stacked in 2 levels to create 12 dorm rooms” (Source: youtube.com)

	“A Urban Rigger is attached to a bulwark (Reling) via a specially designed mooring system, and the entrance is via a gangway bridge.”
Building type:	PUE consists of floating elements, part of naval architecture.
Weather resistance:	
Equipment & facilities:	”There are basically 2 types of apartments; The top (9 pcs.) located on the first floor (about 24 m²), and the bottom (3 pcs.) on the ground floor (approximately 27 m²). All apartments have underfloor heating and contain toilet, bathroom and kitchen. The upper houses consist of a large room with large windows and a bright light, which gives the feeling of a spacious and comfortable apartment. The bottom is more elongated and contains a private terrace directly to the water. The kitchen is equipped with fridge, hob and microwave. The apartments include bed, sofa, table and chairs. There is high speed internet installed.” Downstairs, below sea level, the 230 m² pontoon (basement) comprises of 12 storage rooms, technical room, common fully automated laundry.
Connection to neighboring buildings:	detached (free standing)
Materials used:	Upcycled shipping containers are utilized to create floating student residences. “Containers are entirely made of Corten steel, and their assembly creates a stronger and more durable structure than typical construction methods”
No. of buildings:	1 building, consisting of 9 container units.
No. of residential units:	12 dorm rooms
Storey count:	2 storeys + 1 underwater level (for storage, technical room, laundry room)
No. of persons per unit:	1-2
Built area:	300 m²
Area per person:	23-27 m²
Integration of recreational and/or productive opportunities:	“The apartments form the frame of a common green courtyard (160 m²) with BBQ area, direct access to bathing area, bicycle racks and kayak storage. At the top there is a 65 m² shared roof terrace with outstanding sea views. The basement has a ceiling height of 2.5 meters, and contains

	230 m² of space in technology room, gym, large common room (with freezer and oven), fully automatic laundry, and 12 storage rooms of 6 m3 each.”
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Urban Rigger is equipped with 7KW solar panels (one of the rooftops), power banks, 13kW heat pump. Urban Rigger is also connected to electricity from mainland. “Urban Rigger harnesses the sun with state of the art Q.PLUS BFR-G4.1 solar modules which utilize the proprietary Q.ANTUM technology.”
HVAC:	The objective is good internal climate comfort and keeping energy use to a minimum. There are 800 meters of heat hoses integrated into the hull so that energy from the seawater can be extracted in the same way as in the case of geothermal heat. [Link] “The pontoon is made of concrete with embedded brine hoses that absorb energy from the water on the hull exterior in much the same way as with geothermal energy. The water in the hoses reaches a temperature of 70°C and is subsequently pumped through the system.” Hydro source heating: As URBAN RIGGER is a floating dwelling, it seemed natural to utilize the surrounding water as a free and clean heating source: ˆ The heat transfer rate from water is higher than using the ground as a heat source. ˆ The water is in close contact with the entire pipe at all times enhancing its efficiency. ˆ The flow/circulation of water provides constant energy replacement. ˆ The return temperature to the heat pump is generally 5-6°C higher than ground collectors, increasing the efficiency of the Danfoss heat pump in the URBAN RIGGER. “A cold-water anti-freeze mix is pumped through a series of energy absorbing noncorrosive hydro pex pipes in the base slab of the hull on URBAN RIGGER. As heat naturally flows from warmer to cooler places, the anti-freeze mix circulating around the array is constantly warmed by the sea’s low-grade heat. During summer months, harbor water hovers around 18-21 degrees Celsius, and the URBAN RIGGER facility sends heated water through 800 meters of hydro pex-pipes to the apartments, where the off-grid-connected 5 kWh-capacity Danfoss heat pump boosts temperatures to between 40-55

	degrees Celsius for heating and warm water through the system for floor heating and utility water. In winter months, when seawater temperatures dip as low as 2 degrees Celsius, the heat exchanger boosts water temperatures up to 70 degrees Celsius, which is the perfect level of water temperature each apartment requires for comfort and enjoyable living in the winter months. An efficient, economical, and above all, environmentally responsible and sustainable solution. The Danfoss 5 kW heat pump combined with a 7,5 kWh Hanwha Q-Cells PV panel solution on the URBAN RIGGER roof, charging the dual 3,5 kW Lit-Ion battery banks, creates the sustainable and cost-effective heating source needed, generating a whopping 17,5 kilowatt-hours (kWh) of heat from just 1kWh of electricity, reducing the coefficient of performance for the heat pump, while reducing emissions by 81% compared to conventional heating using natural gas, grid or oil as a power source." Insulation material (of containers): aerogel (which was developed for space travel) and aluthermo reflective insulation. It is a form of insulation consisting of thin aluminium foil made from recycled aluminium derived from beer and soda cans, for example. The foil is mounted on each side of a foam/plastic material. The end result is a material a few millimetres in thickness that reflects the temperature, which means that the total energy consumption conforms to 2020 standards. Urban Rigger thus falls outside the normal district heating regulations." "Every Urban Rigger is equipped with Grundfos energy-saving pumps for wastewater, heating, circulation and drinking water. Danfoss is supplying A+++ energy labelled Heat Pumps the heating for Urban Rigger's floor heating and domestic water." Hydronic floor heating is part of the system.
Solid waste management:	Not specified. Assumption: connected to existing waste management system
Implementation data	
Implemented?	Yes
Year of construction:	first full-scale Urban Rigger was delivered in summer 2016 in Copenhagen.
Designer:	Bjarke Ingels (architect), Kim Loudrup (company founder)
Client:	Partners in the project: o Grundfos Dk A/S: Danish company

	○ dealing with up-cycling of old containers ○ Danfoss A/S: Danfoss technologies are playing a key role in generating heating and cooling, while ensuring internal climate comfort and keeping energy use to a minimum. ○ Miele ○ QCells: producer of solar cells, leader in solar energy solutions. The partnership consists of developing Urban Rigger in terms of sustainability, while the Urban Rigger concept is spread globally.
Executing company:	Udvikling Danmark A/S, which is also co-owned by Kim Loudrup.
Cost of construction:	not specified (rent for one room expected to be roughly 600$ per month)
Funding:	The floating student residence URBAN RIGGER, is a private initiative in response to the unacceptable student housing situation.
Construction time:	Not specified. “The Urban Rigger project has initially targeted seven European cities as key markets. All the markets can be reached by sea from the shipyard in Poland manufacturing the student homes.”
PUE-related patents:	yes: “unique, design protected, patented, floating, flexible CO2 neutral mobile property” The Urban Rigger name and logo are registered trademarks. The Urban Rigger design and geometry is protected under EU patent law.
Life cycle aspects	
Expected time of PUE on-site:	“Development Denmark A / S has entered into a 10-year lease agreement with Refshaleøens Ejendomsselskab A / S, which is the company that manages Refshaleøen”s areas. The lease agreement is time-limited and expires without notice on 1 April 2029. Development Denmark A / S will in good time try to find a new suitable location for the rigs. However, it cannot be guaranteed that by that time (in 2029) it will be possible to find an equally attractive and central location as Refshale Island.”
Reversibility:	PUE is fully reversible, as the Urban Rigger is similar to a house boat. A Urban Rigger weighs more than 600 tons and floats on the water. It can be moved by means of tugs and

	placed in ports in protected waters with a minimum of 2.5 meters of water depth.
Planned reuse/recycling:	After the lease agreement will expire in 2029, the Urban Rigger are supposed to be moved to another location in Copenhagen.
Use of reused/recycled materials during construction:	Up-cycled containers are used to create floating student residences (which have been around the world at least 50 times before they were renovated and used in Urban Rigger) “The container system is a uniform system that is used in every continent. Containers are accessible everywhere. The problem arises when the container reaches the end of its working life. Depending on global steel prices, containers are either melted down or abandoned because they are too expensive to ship. Once the container is melted down, it will have consumed 8.5 megawatt in its life cycle. So instead of recycling, we are focusing on upcycling. In other words, continuing the container’s life cycle in a different way. It costs as little as 450 kilowatts, and it saves approximately 1,100 tons of CO_2 required to build a new, traditional home. By revitalizing these old structures, we help to maintain a low environmental impact of our Urban Riggers.”
Adaptability:	The Urban Rigger in Copenhagen is used as a pilot, where improvements and optimization are still tested. “Urban Rigger therefore embraces the LEGO principle, whereby several units can be arranged in exciting formations with communal rooms and coffee bars, for example, in the form of ‘small floating communities’” “Bjarke Ingels designed URBAN RIGGER using the additional building principles for connectivity and has thus achieved unprecedented flexibility in the floating elements, so that the concept can easily be assembled in floating apartment blocks of varying size as needed and desired.”
Repurpose, reuse, new development of site/building:	Unused quays across the harbor are target areas of Urban rigger
Innovation aspects:	Yes. “The idea was to develop a revolutionary and innovative dwelling system that will have a positive impact on the housing situation for students in Europe, as well as completing an attractive untapped and geographically independent niche in the market, “the water ways” – thousands of kilometers of unused quay’s across the harbor, canal and river intensive cities across the world.”
Comments & references	

Additional comments:	”By far, the most Universities are centrally located in the big cities, The challenge everyone faces in new constructions, is to find available centrally located land to build on. The need for student housing in Europe has created a potential that is inherently enormously. But, in the same way as there is only room for a certain number of cars on a stretch of road before traffic congests, the challenge has been to find the small not-crowded ‘back roads’ that results in getting quickly and easily to same destination as all those who won’t arrive until later due to congestion. And URBAN RIGGER is conceptualized for that “Back Road”: the Water Ways, the thousands of kilometres of untapped harbour, river and canal intensive cities of Europe.” “The prototype of the houseboat of the future weighs in at 650 tons, so even though it’s floating, the constructors say it can withstand the worst waves.” “The goal has been to create new standards for creative, environmentally friendly and – to some extent - self-sufficient accommodation. [...] Sustainability is part of the plan, so as much energy as possible come from solar energy” “While developers are queuing up to build expensive, attractive quayside housing projects, there is lots of space along the wharfs, rivers and canals of the European cities with the greatest need for student accommodation,” says Kim Loudrup. “’A survey from 2015 shows that we have a shortage of 20,000 student homes in Denmark, and despite ambitious building projects in many Danish cities, the figure remains unchanged, as the influx of students increases proportionally. And Denmark is only number 21 on the list of European countries with a shortage of student accommodation. In 2025, there will be a shortage of four million beds in Europe,’ explains the entrepreneur, who has already presented his idea in several countries.” Development Denmark A/S has initiated the production of another 5 Urban Rigger. The 5 new Urban Riggers (60 apartments) are expected to be completed on 1 April 2019. All quotes, except where indicated, are taken from the project website.
Additional references:	http://www.urbanrigger.com/

	http://www.urbanrigger.com/wp-content/uploads/2018/04/Urban-Rigger_Salgsprospekt_060418.pdf https://www.youtube.com/watch?v=8Kb7v2c-V6Q https://www.youtube.com/ https://www.youtube.com/watch?v=rCTtRk_CiqE https://www.danfoss.com/en/about-danfoss/insights-for-tomorrow/urban-rigger/ https://www.youtube.com/watch?v=Zf74-0F7WrY https://visplaner.plandata.dk/visplaner/lokalplaner.html Note: as most sources are available in Danish only, Google Translator was used.

Image 77: Urban Rigger

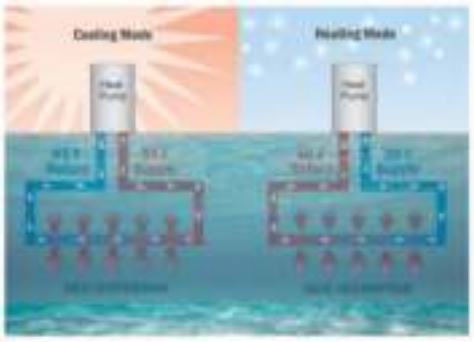


Image 78: Urban Rigger

Image 79: Urban Rigger

Image 80: Urban Rigger

30. TEMPORARY CONTAINER HOUSING, ONAGAWA

Project website:

https://www.world-architects.com/md/architecture-news/reviews/onagawa-container-temporary-housing

Image 81: Hiroyuki Hirai

Image 82: Shigeru Ban Architects

Project description:

Multi-story building constructed 9 months after Tsunami in 2011. Made of containers, residents are very satisfied.

Particularities of the Project:

Satisfied residents; container building with open spaces

User specific aspects	
User groups:	people affected by disasters
Drivers/triggers:	Earthquake and Tsunami in on March 11th, 2011
User experience:	“residents are so satisfied with their interim accommodations that they have already expressed a desire to live there longer than the established two-year term” (Source: Masteremergencyarchitecture)
Location and environment	
Location:	Onagawahama, Onagawa, Oshika District, Miyagi Prefecture, Japan 38.4522 141.4397 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	36 m
Physical properties	
Site type:	Sports Field (Baseball)
Plot area:	12.320 m²
Construction type:	Modular (Source: Designboom)
Foundation type:	Assumption: reversible
Building type:	building (more than 2 units per building)
Weather resistance:	not specified; assumption: resistant to local weather conditions
Equipment & facilities:	units are “fully equipped”: bathroom, toilet, kitchen
Connection to neighboring buildings:	detached (free standing)
Materials used:	Containers and metal structure “checkerboard” community center: plywood roof
No. of buildings:	9 residential buildings and 3 community buildings
No. of residential units:	189
Storey count:	three buildings with 2 floors and six buildings with 3 floors
Built area:	TFA: 5.671 m²
Integration of recreational and/or productive opportunities:	community space like open-air market and community room
Utilities	
Water supply:	not specified; assumption: connected to centralized supply

Sanitation system:	not specified; assumption: connected to centralized sewage network
Electricity:	not specified; assumption: connected to energy network
HVAC:	not specified; in Japan, electrical heating is very common
Solid waste management:	not specified; assumption: connected to centralized system
Implementation data	
Implemented?	Yes
Year of construction:	2011
Designer:	Shigeru Ban
Client:	Onagawa town government
Executing company:	TSP Taiyo Inc
Cost of construction:	not specified; apparently ”low-cost”
Funding:	public plus donations (Interior built-in furniture production and installation: Voluntary Architects Network (VAN) Interior tables donated by moreTrees + Louis Vuitton Forest Interior curtains and lighting donated by Ryohin Keikaku On-site Market donated by Ryuichi Sakamoto On-site Workshop: donated by Hiroshi Senju)
Construction time:	9 months
Plot ownership:	municipal
Life cycle aspects	
Expected time of PUE on-site:	not specified; still existed in 2016 (verified on Google Maps)
Comments & references	
Additional references:	https://www.designboom.com/architecture/shigeru-ban-onagawa-temporary-container-housing-community-center/ http://masteremergencyarchitecture.com/2012/05/07/shigeru-ban-temporary-container-housing-in-onagawa/

Image 83: designboom.com

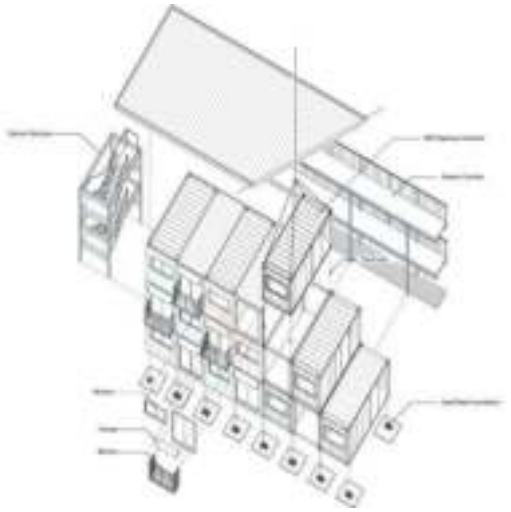


Image 84: Shigeru Ban Architects

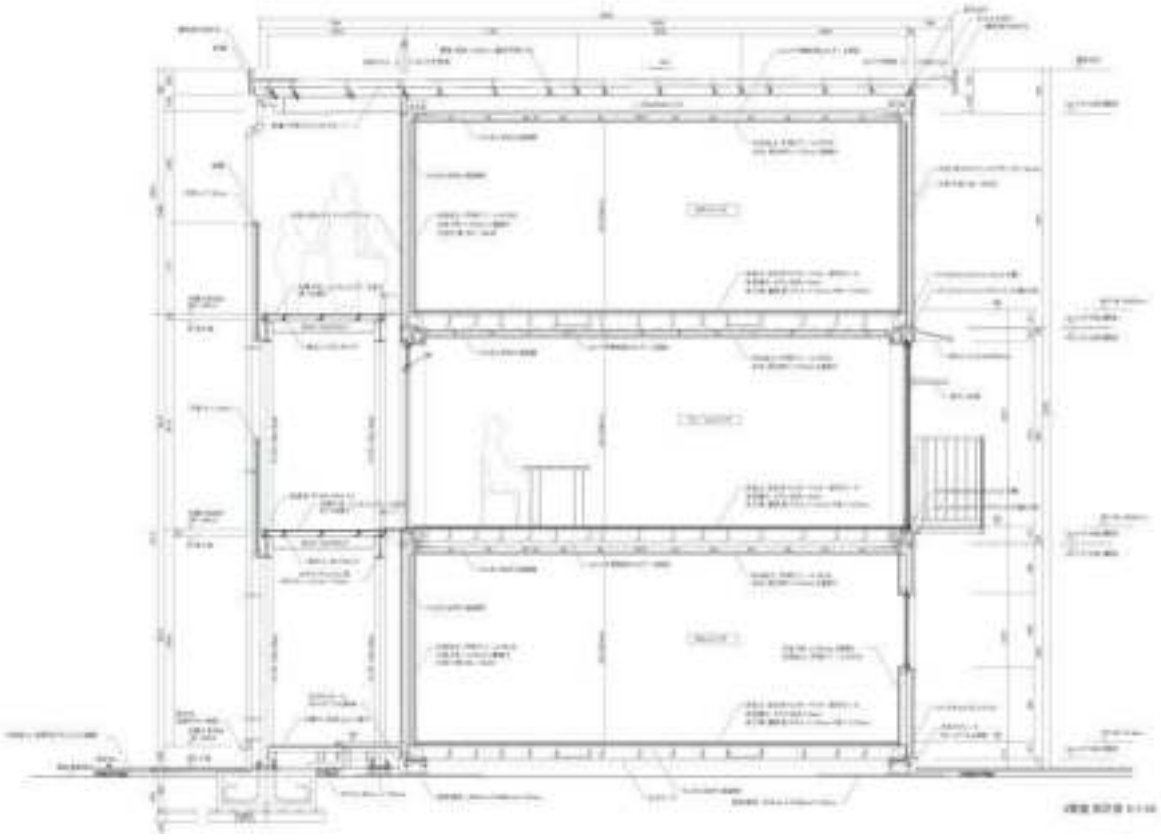


Image 85: designboom.com

31. HAUS LIEBHARTSTAL

Project website:

https://www.samariterbund.net/wohnen-und-soziale-dienstleistungen/fluechtlingshilfe/jugendliche/haus-liebhartstal/

Image 86: Google Maps

Project description:

A former retirement home in need of renovation was repurposed for accommodating unaccompanied minor refugees.

Particularities of the Project:

Repurpose of an existing building

User specific aspects	
User groups:	unaccompanied minor refugees, both male and female. The children are between 14-18 years old and originate from Somalia, Afghanistan, Syria and various African countries.
Drivers/triggers:	Due to the increase of incoming refugees to Europe in 2015, ASB (Arbeitersamariterbund) opened an old retirement home to provide additional living space. The city's welfare fund "Fonds Soziales Wien" owns the old retirement home and assigned ASB to run the place.
Social mix & cohesion:	The building consists of 2 parts: a multistorey tower, which is lived in by refugee families and a side wing which is inhabited by unaccompanied minor refugees, both male and female. There are only 2 refugee houses in Vienna that are coeducational - meaning that both male and female

	youngsters are living together (however, the bedrooms are gender-separated). NOTE: This example only refers to the side wing for unaccompanied minor refugees. The groups are organised in flat sharing groups of 15 persons (This ratio of caretakers/caregivers is prescribed by the municipal authority for child and youth welfare). The young people are allowed to stay in those tenant groups up to their 18th birthday. There is also one shared flat for an aftercare tenant group people up to 23 years. This is only possible as the number of arriving unaccompanied minor refugees is decreasing and thus there is space available in Haus Liebhartstal. There is good cooperation with the competent authorities of the city district Ottakring. Events have been events organised, where the neighbourhood got involved as well. There have been complaints about playing volleyball in the yard by an adjoining ice cream parlour, so the volleyball activities were moved to the backyard. Since then, there were no more complaints.
Gender-sensitive aspects:	Both male and female unaccompanied minor refugees are living in Haus Liebhartstal. There are only 2 refugee houses in Vienna that are ”Ko-edukativ” - meaning that both male and female youngsters are living together (however, the bedrooms are gender-separated).
Location and environment	
Location:	Thaliastraße 157, 1160 Vienna, Austria 48.2132 16.3043 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Sea level:	222 m
Physical properties	
Site type:	developed field (residential area)
Plot area:	guesstimate: approx. 12.100 m² (measurements taken from wien.gv.at - city map)
Building type:	building (more than 2 units per building)

Equipment & facilities:	A 2-person room is equipped with bathroom and toilet, balcony, bed, cupboard. Flowers and plants for the balconies were donated to the residents. The rooms can be locked (However, the counsellors have a master key in case of emergency). Every tenant group (15 persons) have a shared kitchen, where they receive a warm lunch during the week. On evenings and on weekends, the residents have to cook for themselves. The kitchens are in need of renovation. The rooms are equipped with carpets, as it is important for the comfort of living for the residents. There were complaints by MA11 due to fire hazard concerns, but eventually, the residents were allowed to keep the carpets. However, fire management systems were ramped up (fire extinguishers, fire detectors)
Connection to neighboring buildings:	detached (free standing)
Materials used:	The building was formerly used as a retirement home. The old rooms are repurposed, thus no additional building material was used for the pop-up unit. However, the building is in rather poor condition, and is in need of refurbishment.
No. of buildings:	1
No. of residential units:	Assumption: 30 (45 minors = 3 tenant groups, 15 young adults = 1 tenant group in rooms for 2)
Storey count:	5
No. of persons per unit:	2 persons per room, 15 persons per tenant group. In special occasions there is only one person per room (e.g., if a person has to move out due to his/her 18th birthday and it takes some time until the bed is assigned to the next unaccompanied minor refugee.
Built area:	guesstimate: approx. 2.700 m² (measurements taken from wien.gv.at - city map) NOTE: Only part of the building is used for unaccompanied minor refugees (maybe about 1.200 m²)
Integration of recreational and/or productive opportunities:	The recreational room is equipped with table soccer and table tennis tables (e.g., tournaments are hosted). There have been donations to Haus Liebhartstal, e.g., bikes. Bicycle classes were organised. The garden of Haus Liebhartstal is used more often by the residents of the other part of Haus Liebhartstal (where families are living).

	There is a music room, equipped with guitars and e-guitars, drums, keyboards, ... There have been workshops to build furniture from Euro-pallets to furnish the balconies. The courtyard is used for playing volleyball. A fully equipped fitness room is available in Haus Liebhartstal. The former dining hall of the retirement home is refurbished to be a festival hall, where there are parties, dancing workshops, cooking classes, etc. Artists are offering drawing classes for residents to facilitate easier processing of their flight experiences.
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Unknown. Connected to centralised system
HVAC:	Unknown. Connected to centralised system
Solid waste management:	Connected to centralised system
Implementation data	
Implemented?	Yes
Client:	Fonds Soziales Wien, ASB (Arbeiter-Samariterbund)
Plot ownership:	Fonds Soziales Wien owns the building.
Life cycle aspects	
Expected time of PUE on-site:	Unknown. (Starting in fall 2018, there are major renovation works planned. This could be an indication that the plans for temporary use only have been scrapped and now the usage is planned for a longer period of time).
Reversibility:	The building itself is not reversible.
Potential/planned secondary use concepts for TH-units:	The building is in need of refurbishment. A new retirement home has been built closeby and the old one was abandoned. Due to the increase of refugees coming into Europe in 2015, more capacity for housing those refugees was needed and the Haus Liebhartstal was reopened again. In between, it was also used for assistance to homeless persons.

Adaptability:	The building is in need of refurbishment. It has been adapted to be suitable for unaccompanied minor refugees. The basic suitability of repurposing an abandoned retirement home for refugees is high, as there already were small living units before. Some of the common rooms were adapted to the needs of young people. The hallways were dull and colorless, so the residents painted murals in order to appropriate the building as their own.
Repurpose, reuse, new development of site/building:	yes, repurpose of abandoned retirement home

32. CUVRYBRACHE, BERLIN

Project website:

https://www.zeit.de/gesellschaft/zeitgeschehen/2014-07/cuvry-brache-kreuzberg (newspaper article)

Image 87: William Veder

Image 88: Sabeth Stickfort

Project description:

Without water, sanitation and electricity, more than 100 persons lived informally on a wasteland in Berlin-Kreuzberg, right next to the river Spree. The area was dubbed “Cuvrybrache” or “Favela of Kreuzberg”. The persons living there used bulky waste, old furniture and tarpaulin for their makeshift shelters. In 2014, after a fire, this informal settlement was demolished by local authorities.

Particularities of the Project:

This is an example of an informal settlement on wasteland in the middle of Berlin. Due to the fact that the owner was not building on the vacant land, it was appropriated by persons with low or no income, no other home, no residence permit or downshifters, artists or musicians. The plot is privately owned, thus police and regulatory agencies are not allowed to evict the residents. This could only be initiated by the owner. The plot is actually in a good location (see Image 90), as it is right next to river Spree. This is also an example of what could happen to vacant plots if the owner is not taking care of it.

User specific aspects	
User groups:	Squatters, homeless persons, artists, migrant workers, refugees, downshifters, families of Sinti and Roma ethnicity
Drivers/triggers:	Various reasons for people to decide living on Cuvrybrache: e.g., lack of money and no job. No possibility to rent a flat in Berlin as it is too expensive.

	Some artists and free spirits were living there voluntarily, as they appreciate the level of freedom or the material liberation. For them, this vacant lot is part of an ideology, a remainder of former times when Kreuzberg used to be a scruffy place, with low rents and full of punks. The plot was left vacant for quite some years by the legal owner, an investor from Munich. Initially, the vacant plot was occupied by squatters in protest of building plans for the area (shopping mall resp. BMW Guggenheim Lab). Over time, a tented camp and later a tented village developed on-site. Residents of the vacant plot and neighbours demanded “Free Cuvry”. The tented village should stay, as a social experiment and visual protest against the gentrification of the area. (Apin, 2014)
Social mix & cohesion:	There were approx. 60-100 Persons living on Cuvrybrache, including women and children. There are major problems with (hard) drugs, alcohol, theft, fights. Living there was described by some residents as living without rules. The formal neighbourhood seemed to tolerate them to a certain degree, however, there have been complaints by restaurant owners about left-over pizza being stolen, beggary etc. However, over the years, the tolerance declined.
Location and environment	
Location:	Cuvrystraße 51, 10997 Berlin 52.5000 13.4467 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Informal setting (squatters)
Climate:	Continental
Sea level:	35 m
Physical properties	
Site type:	mixed residential use - The plot is supposed for residential purposes, however, the owner did not build on it, thus squatters appropriated the plot for housing.
Plot area:	guesstimate: approx. 9.075 m² (measured on Google earth)
Construction type:	self-made shacks, tents, burrows
Foundation type:	reversible foundation (if any)

Building type:	tents and makeshift shacks
Weather resistance:	Shacks are lacking proper insulation material, thus not resistant to cold weather. Residents sometimes have to endure 0°C or below. Assumption: Also rainfall might be a problem.
Equipment & facilities:	varies from case to case. Very basic interior. Sleeping place (mattress or just sleeping bag). basic furniture (e.g., sofa, table), sometimes stove
Connection to neighboring buildings:	detached (free standing)
Materials used:	Bulky waste, Euro-pallets, tents, corrugated sheet iron
No. of buildings:	about 30-60 tents and shacks
No. of residential units:	guesstimate: 30-60
Storey count:	1
No. of persons per unit:	1-2 persons per unit (about 100-200 in total; high levels of fluctuation)
Built area:	guesstimate: approx. 1.500 m² (measured on Google earth)
Area per person:	approx. 15 m²
Integration of recreational and/or productive opportunities:	campfire with seating area (old, worn sofas) for relaxing, bumming around. Music instruments (guitars, drums)
Utilities	
Water supply:	no water supply or shower available. Residents use charity services (e.g., Bürgerhilfe, Rotes Kreuz) for showering or use showers of friends (or they go swimming in river Spree). For water they use bottles or jerrycans for drinking, cooking, washing dishes, etc.).
Sanitation system:	no toilet available. The residents have to make arrangements with neighbouring bars and restaurants, or they use two pits next to river Spree, where there is high odour nuisance.
Electricity:	No electricity supply available

HVAC:	heating by candles, wood, or gas stoves. Every evening there is a bonfire for warmth and socialising
Solid waste management:	No solid waste management system implemented. There is a rather high load of vector animals (vermin, rats, etc.) and odour nuisance.
Implementation data	
Implemented?	yes, the Cuvrybrache existed between 2012 and 2014, probably
Year of construction:	2012
Designer:	Sheds are self-made by residents
Executing company:	informal setting, no companies involved. The founder is called “Flieger”, who later abandoned Cuvrybrache due to lack of rules and initiated another informal settlement project called Teepeeland (also next to river Spree)
Cost of construction:	Materials were collected from bulky waste or scrounged.
Construction time:	This informal settlement developed more or less spontaneously. It was torn down in 2014.
Plot ownership:	A businessman from Munich is the owner of the plot
Life cycle aspects	
Expected time of PUE on-site:	as an informal settlement, there was no planned time on-site. The occupation of Cuvrybrache had a duration of 2012-2014.
Reversibility:	The PUE is fully reversible, as it only consisted of makeshift, temporary shelter. In September 2014, there was a fire in the camp (after an alleged arson attack) and afterwards excavators tore down the whole camp. Beginning of construction works for an apartment building were planned for 2015. (Schurmann et al. (2014), Stollowsky (2014))
Planned reuse/recycling:	There is no mentioning of further plans with the shacks and tents. The exception is one of the houses, which was built by a young architect, who lived and worked on Cuvrybrache as an experiment. This house is allegedly supposed to be bought by a museum and displayed in an exhibition. After a fire in 2014, the whole camp was demolished by excavators. The remaining bulky waste was removed and brought to waste disposal.

Use of reused/recycled materials during construction:	All the sheds are made of bulky waste, old wooden beams, and other waste materials, as the residents don't have money and create and construct makeshift huts with very limited means
Adaptability:	Depending on the current residents and the availability of bulky waste, the Cuvrybrache was adapted to the most urgent needs throughout its period of existence.
Comments & references	
Additional comments:	After the Cuvrybrache was affected by a fire in 2014, the informal settlement was removed by local authorities. Since 2017 (according to pictures from the past on Google Earth,), construction works have started on the plot. There will be an apartment building with supermarket and nursery school. The former residents were moved to emergency shelters, homeless shelters. Some of the former residents of Cuvrybrache were allegedly not interested in staying in formal shelters but were looking for other vacant land or vacancies to continue their lifestyle in informal settlements (Schurmann et al., 2014) Some of the residents suffer from diseases (Lice, open wounds, skin rashes), addictions and such.
Additional references:	Poverty in Germany – Slum in Berlin. TV news report on SAT1 Frühstücksfernsehen (2014) - https://www.youtube.com/watch?v=el1kqV3nNC8 Freiwillig leben im Berliner Slum. taff, 14.05.2014 - https://www.prosieben.at/tv/taff/video/20149-freiwillig-leben-im-berliner-slum-clip Sara Schurmann, Sandra Drassler, Thomas Loy 2014: Auf der Cuvry-Brache sind jetzt alle Hütten abgerissen - https://www.tagesspiegel.de/berlin/polizei-justiz/berlin-kreuzberg-auf-der-cuvry-brache-sind-jetzt-alle-huetten-abgerissen/10736414.html Christoph Stollowsky 2014: Nach dem Brand rollen die Bagger an - https://www.tagesspiegel.de/berlin/bezirke/friedrichshain-kreuzberg/zukunft-der-cuvrybrache-in-berlin-nach-dem-brand-rollen-die-bagger-an/10731560.html Berliner Kurier 2014: Die Slums von Kreuzberg. Das ist nicht Bombay, das ist Berlin - https://www.berliner-kurier.de/berlin/kiez---stadt/die-slums-von-kreuzberg-das-ist-nicht-bombay--das-ist-berlin--2494440 Nina Apin 2014: Im Slum von Kreuzberg. Jesus, Mama und der Müll - https://www.taz.de/!5040618/

Image 89: Reuters

Image 90: Google Earth

33. HAWI

Project website:

https://www.caritas-wien.at/aktuell/news/information/news/74867-caritasstellt-neuartiges-wohnprojekt-fuer-studentinnen-und-junge-fluechtlinge-vor/

Image 91: https://wien.orf.at/news/stories/2892898/

Image 92: tnE Architects ZT GmbH, https://ewalenart.com/Austrian-Pavilion-Biennale-di-Venezia-2016

Project description:

“Primary care facility & Student residence 2016-2018” (Orte für Menschen)

Particularities of the Project:

local students living together with young migrants

User specific aspects	
User groups:	70 students and 70 refugees (45 are minors) "140 girls and boys of different nationalities will live in Hawi in the fall. 45 unaccompanied minor refugees will find a new home at Kempelengasse 1 at the end of July, and 25 young refugees from the age of 18 will receive aftercare places. In September 70 students and young people in vocational training will move in." (Source: Caritas)
Drivers/triggers:	high demand of living space for migrants
Social mix & cohesion:	70 local students and young professionals together with 45 young unaccompanied refugees; users live together in an experimental co-living like a flat-sharing community
Gender-sensitive aspects:	foreign boys and girls living together

User experience:	apparently very good: “It’s like a family. It goes beyond the traditional scope of integration. It’s about the relationships that are formed here. About friendships.” (Source: Radio FM4)
Location and environment	
Location:	Kempelengasse 1100 Wien, Austria 48.1745 16.3940 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Continental
Sea level:	204 m
Physical properties	
Site type:	commercial area
Plot area:	27.126 m²
Construction type:	constructed on site, permanent building
Foundation type:	Assumption: concrete
Building type:	building (more than 2 units per building)
Weather resistance:	
Equipment & facilities:	“Orte für Menschen” states that there are no showers but there must have been a sanitation system
Connection to neighboring buildings:	detached (free standing)
Materials used:	concrete etc.
No. of buildings:	1
No. of residential units:	units are rooms for 2, 3 or 4 persons; total number of units estimated: maximum 70

Storey count:	4, 5 and 6 floors
No. of persons per unit:	2, 3 or 4; rooms are former offices - size 19-72 m²; there are wooden modules inside to create privacy (12 “private Cabins”, see Image 92)
Built area:	estimated: 9.000 m²
Area per person:	2,75 x 1,40 x 2,05m / 7,6 m³
Integration of recreational and/or productive opportunities:	community spaces for open use as well as gym, workshop, etc. (see pictures on Facebook and Orte Für Menschen) 5,200 m² exterior area
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local electricity grid
Implementation data	
Implemented?	Yes
Year of construction:	building from the 1980s, the HAWI concept was established in 2016
Designer:	The next ENTERprise Architects
Client:	Caritas, among others
Funding:	Assumption: state-funded through Caritas University contributions (Project: home not shelter), etc.
Plot ownership:	private; PFI Real Estate Gruppe
PUE-related patents:	
Life cycle aspects	
Expected time of PUE on-site:	3 years; project was terminated earlier due to general reduction of refugee housing projects (reduction in funding due to less migrants coming to Austria)

Reversibility:	Can be used as office or residential building again
Planned reuse/recycling:	modules can be reused
Adaptability:	the cabins itself are very small and cannot be enlarged easily
Repurpose, reuse, new development of site/building:	○ originally it was an office building from the 1980s ○ Central access cores with toilets and small kitchen infrastructure ○ Access from centrally located hallways of rooms: 5-7m ○ adjustable element walls floor system and suspended ceilings
Innovation aspects:	Local students living together with young migrants
Comments & references	
Additional comments:	students were renting for 260-360 Euros/month (Source: katholisch.at)
Additional references:	Radio FM4: https://fm4.orf.at/stories/2891211/ Orte für Menschen: https://www.labiennale.at/2016/page.php?id=616:3666 https://www.facebook.com/savehawi/ http://www.tne.space/orte-fuer-menschen/ https://homenotshelter.com/portfolio/home-not-shelter-wien-traudi/ http://amkempelenpark.at/2016/06/08/orte-fuer-menschen/ https://www.caritas-wien.at/aktuell/news/information/news/74867-caritas-stellt-neuartiges-wohnprojekt-fuer-studentinnen-und-junge-fluechtlinge-vor/

34. STARTBLOK RIEKERHAVEN

Project website:

https://startblokriekerhaven.nl/en/

Image 93: https://world-habitat.org/world-habitat-awards/winners-and-finalists/startblok/

Image 94: https://startblokriekerhaven.nl/en/living-startblok/the-grounds/

Project description:

Startblok is a housing project for young refugees who have recently received their residence permit (status-holders) and for young persons from the Netherlands. In cooperation with Socius Wonen and the Municipality of Amsterdam, housing organisation De Key is developing Startblok at Riekerhaven, a former sports-grounds next to the A10 highway in Amsterdam New West. Here at Startblok these youngsters will get the opportunity to help each other in building their futures together.

Particularities of the Project:

quite big dimensions; mix of young locals and foreigners; residents are asked to actively participate

User specific aspects	
User groups:	young people from 18 to 27 years old: 282 status-holders and 283 Dutch youngsters
Social mix & cohesion:	Tenants from Startblok are going to organize and control their own living environment. They'll look after it themselves and start initiatives to organize learning, sports and culturally related activities and events. To reinforce the aim of social cohesion, no couples are allowed to move into the project together and families are generally not permitted. (Source: The Guardian)

Location and environment	
Location:	Startblok Riekerhaven, Riekerhaven, 1062 Amsterdam, Nieuw-West 52.3429 4.8366 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	-1 m
Physical properties	
Construction type:	modular (containers)
Foundation type:	Assumption: reversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	The 463 private studios are about 23 m² and have their own kitchen and bathroom. The studios are for one person only, but together with 16 to 32 other tenants you form a living group and get the opportunity to spend time together in the common living rooms and outside areas. There are 42 apartments for 2 persons and 6 apartments for 3 persons. All the 102 private (bed)rooms in the apartments have a floor surface from about 12 m² or 14 m². The apartments also have a shared living room from about 25 m². In a three-room apartment you will have your own (bed)room and share a living room/kitchen, shower, and toilet with one other person. In a four-room apartment you will have your own (bed)room and share a living room/kitchen, shower and toilet with two other persons.
Connection to neighboring buildings:	detached (free standing)
Materials used:	Containers
No. of buildings:	7 on plan, 9 according to world-habitat.com
No. of residential units:	511 (436 studios for one person only, 43 apartments for 2 and 6 apartments for 3 persons); All the 102 private

	(bed)rooms in the apartments have a floor surface from about 12 m² or 14 m². The apartments also have a shared living room from about 25 m². In total, 565 people can be hosted.
Storey count:	2 and 3
No. of persons per unit:	1-3
Area per person:	12-23 m²
Integration of recreational and/or productive opportunities:	Outside, two seating areas will be created. Here you can relax in the sun or barbecue with your roommates and buddies in the evening. Furthermore, there is plenty of space for various activities, such as gardening, sports and all the any other initiatives residents come up with. Apparently, there are sport fields close-by/on the site. The open space is bounded by a low fence and it seems as if gardening is practised in high raised beds: (see omniplan.org)
Utilities	
Water supply:	Connected to centralised water supply system
Sanitation system:	Connected to centralised wastewater system
Electricity:	Not specified
HVAC:	Not specified
Solid waste management:	Not specified; assumption: connected to network
Implementation data	
Implemented?	Yes
Year of construction:	2016
Client:	social housing corporation De Key; The Municipality of Amsterdam is closely involved with Startblok. This is because of their task to create more housing for youngsters in Amsterdam and especially for young status-holders
Funding:	Not specified; assumption: maybe social housing corporation De Key

Construction time:	construction started in January 2016 and was planned to finish in the summer of the same year (see Boss Magazine, n° 55, page 28ff)
Plot ownership:	not specified; assumption: municipal
Life cycle aspects	
Expected time of PUE on-site:	Its lease on the tatty football ground is only for nine years, and there is already talk of the complex being demolished and replaced with properties aimed at wealthier young professionals. (Source: The Guardian) Until 2026 according to world-habitat.com Any single resident can stay for a maximum of 5 years
Adaptability:	the units can't be expanded
Innovation aspects:	Who exactly are these residents then? De Key has placed a request with the Central Agency for the Reception of Asylum Seekers (COA) for refugees with a certain profile. The most important requirement is that the refugee is under 27 and single. Concerning the level of education and job prospects, de Key is looking for a mix. The locals are selected based on their motivation – first and foremost the concept should appeal to them. The 24 m² rooms are equipped with a private kitchen and bathroom. Furthermore, clusters of 25 residents share a common space in which they can dine together, host a party or organise other activities.
Comments & references	
Additional comments:	At Startblok, tenants get the opportunity to help managing their own living environment. Every aspect of Startblok has room for initiatives and contributions of its tenants, this is called self-management. Tenants organize everything that can be organized by tenants. Do-It-Yourself: Self-management is a flexible system allowing opportunities for tenants to devise and implement their own initiatives which will help create a pleasant atmosphere and strengthen social cohesion. Self-management is split into two branches: social management and general management. Social management focuses on forming a community and social cohesion, covering everything necessary to create and maintain a comfortable, clean, safe and livable environment. General management is responsible for all other daily affairs. For example, these managers are responsible for recruiting and selecting new tenants, taking care of social media, email and maintenance requests as well as coordinating social initiatives, activities and events (see Image 96)

Additional references:	https://www.telegraph.co.uk/property/abroad/inside-amsterdams-pop-up-village-social-conscience/ https://world-habitat.org/world-habitat-awards/winners-and-finalists/startblok/#outline https://omniplan.org/projecten/gebiedsontwikkeling/het-startblok-riekerhaven-amsterdam-nieuw-west Boss Magazine, n° 55 on Issuu

Image 95: https://startblokriekerhaven.nl/wonen-in-het-startblok/woonruimtes/

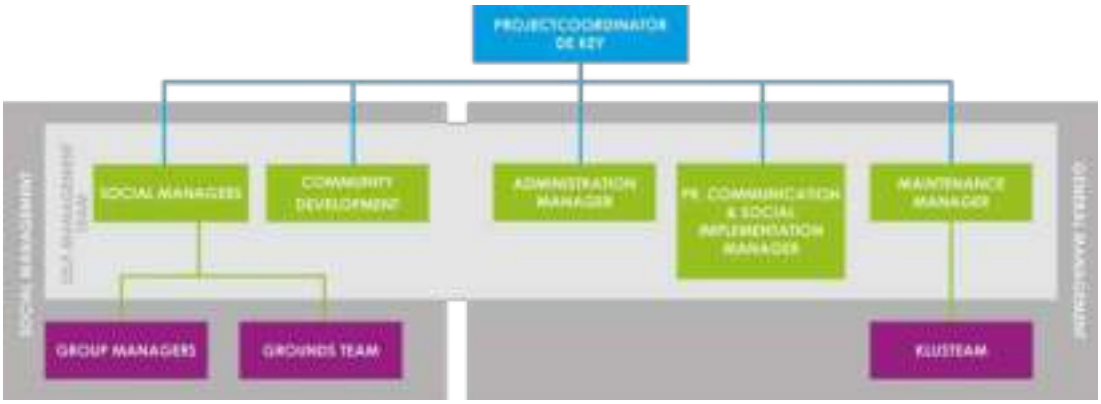


Image 96: https://startblokriekerhaven.nl/en/about-the-project/self-management/

35. WAGENDORF LOHMÜHLE

Project website:

http://www.lohmuehle-berlin.de/blubb/

Image 97: Ana Lisa Alperovich, https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

Image 98: Ana Lisa Alperovich, https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

Project description:

This is an example of a Wagendorf (trailer park; literally: trailer village) in Berlin, that seems to be well-organised and where ecological considerations are seemingly part of the living philosophy of the community. Being founded in 1991 by occupying space in the city, this trailer park has existed for a long time. As of 2007 (stated in the book Urban pioneers), there still hasn't been any official user contract. (No more recent information available).

Particularities of the Project:

This is an example of alternative housing and living in urban environments, which is at the same time a cultural project. The inhabitants of the Wohndorf Lohmühle are hosting cultural events (exhibitions, concerts, ...) all year long in an event venue and the open spaces of the Wohndorf. Another focus of the community is finding environmentally friendly solutions to organise their self-sufficient housing situation and living. Living within the naturally given boundaries and do so without "standard" amenities of urban life is their contribution to environmental protection and conservation of resources.

"For us, it is not a problem not to be connected to the supply and sewage system, but the chance to learn to consciously deal with the resource water. Even the electrical energy does not come out of the wall for us. Through the power supply via solar panels or wind generators, we experience finiteness and learn to manage our households in a new way here as well."

User specific aspects	
User groups:	Mixed backgrounds of residents: Artists, teachers, social workers, nurses, clowns, students, etc. (as stated on

	homepage: average of the population). Some have regular jobs, some are freelancers, some are without job. Mixed age groups: 26-54, as well as a few children.
Drivers/triggers:	The Wagondorf was founded by two persons in 1991, who moved out of the trailer park “Waldehalde” and were looking for a new place to live. They squatted on a plot that was part of the “death strip” of the Berlin Wall, that had been torn down in the previous years. Over time, other squatters moved to the plot with their trailers and caravans and started living together.
Social mix & cohesion:	The community is organised as a club (Verein Kulturbanausen e.V.) and holds weekly plenary meetings to make decisions about their living environment (e.g. about cultural events) in consensus. If no consensus can be found, an idea is dropped again. This requires lots of talking, discussing and mutual understanding. Community spirit seems to be an important part of this trailer park project. Objectives of the club is to strengthen the interests of the residents and to foster culture, art, ecology, and social engagement in the district of Alt-Treptow. In total, at the moment, there are living 21 persons at Wagendorf - mainly adults and a few children. It is possible for guests to live for some days in one of the guest trailers, however, in summertime it is usually fully booked by relatives and friends of the residents. Cats, dogs, rabbits, (tortoises) and other animals are also part of the Wagendorf and an essential part of quality of living for the residents.
Gender-sensitive aspects:	not specified. Both men, women and children live in this PUE.
User experience:	During winter, temperatures can be quite low in the trailers. In winter, mice are trying find shelter in the trailers, while in summertime, wasps and hornets are looking for nesting sites in the walls of the trailers.
Location and environment	
Location:	Lohmühlenstraße 17, Treptow 52.4927 13.4434 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	mainly informal setting (orgins: squatting of public space without formal agreements). Local authority tolerates the project resp. is increasingly accepting and cooperative.
Climate:	Continental

Sea level:	34 m
Physical properties	
Site type:	grey field (formerly: death strip next to Berlin wall); zoning plan: half of it green area, other part building land
Plot area:	8.120 m² (Guesstimate; measured on Google Earth)
Construction type:	mainly refurbished construction trailers, truck trailers, wagons, DIY wooden trailers / containers.
Foundation type:	most of the trailers are on wheels (however, not necessarily fit for driving)
Building type:	house (1-2 units per building)
Weather resistance:	Might vary from accommodation to accommodation. Insulation is allegedly quite poor. Being cold in wintertimes is part of the lifestyle.
Equipment & facilities:	Depending on the individual trailers and the needs of the individual owners this might vary. However, one 22 m² trailer is described as having a sleeping area, living room area and a workspace, kitchen with sink (but no running water). A watering can shower (also without running water) is located outside and shared by all residents. Same with the pit latrines. The so-called ”Kanzleramt” (literally: the chancellery) is a room used for community gatherings (shared living room)
Connection to neighboring buildings:	detached (free standing)
Materials used:	old truck trailers, busses, self-made wooden constructions from bulky waste
Repurpose, reuse, new development of site/building:	Previous to being the location of Wagendorf Lohmühlenstraße, the plot was part of the Berlin Wall death strip. After the fall of the Berlin Wall, a corridor of unused space was available. Squatters (from the Punk and Hippie scene) appropriated the area of the Lohmühle for their ideas of alternative housing (1991 onwards). They had to move twice, but stayed more or less in the same area. From the beginning, they started planting trees and plants on the concrete ground and transforming the plot into a green haven.
No. of buildings:	not specified, maybe 10-20

No. of residential units:	not specified, maybe 10-20
Storey count:	1
No. of persons per unit:	1-2 (In total, at the moment, there are 21 persons living at Wagendorf - mainly adults and a few children.)
Area per person:	approx. 10-20 m² (depending on the trailer, shed layout)
Integration of recreational and/or productive opportunities:	A public stage and event center (including a bar) is part of the Wagendorf Lohmühle. With regular public events, the residents are involving the neighbourhood. The events themselves are free of cost. Revenues from selling drinks at events are reinvested into Wagendorf. A children's playground is part of Wagendorf Lohmühle, which is also used by neighbourhood kids. The open spaces are used for gardening activities, the residents seem to be proud about having transformed a plain concrete area (former death strip of Berlin Wall) into a green haven. The trees that have been planted were often rescued from the waste collection. The idea is to provide habitat for plants and animals who have troubles in urban areas.
Utilities	
Water supply:	drinking water has to be bought and carried along with water containers. Service water (for washing dishes, showering, etc.) comes from a hand-pump (groundwater) or rain barrels. For showering, the required water has to be pumped by hand into a watering can and is then used in an improvised shower cubicle. The residents don't use conventional shower gel, but mineral clay products, as the showering water directly goes back into the ground (and groundwater) through seeping pits. Some residents choose to heat their showering water on gas stoves, others shower with cold water only In winter times, both the hand-pump water and the rain barrel water can freeze. Residents either carry an additional amount of water needed to their homes or they organise to shower at friends' places or at public facilities.
Sanitation system:	There is a pit latrine system available on site. A plant-based water purification system is available on site, however, it is unclear if it is used to treat the service water only, or also for treating the feces.
Electricity:	There is no connection to the central electricity grid. All the trailers are equipped with solar panels, yielding just enough electricity to cover the daily needs of the residents (light, ICT, ...). In winter times, electricity usually is more scarce. In 2009,

	a small wind turbine was installed next to the event venue to cover the electrical needs for concerts, etc. Due to the fact that there is no electricity on the plot, cooling (of drinks and food) is managed with an earth cellar, where also the supply of beverages for public events is stored. The residents avoid electrical equipment and refer to manpower for their construction works (they are not using electrical saws and such) to keep their energy demand low. However, personal ICT equipment is used by the residents.
HVAC:	There is no connection to a central heating system. Many residents use propane gas for cooking and wood burning ovens for heating. However, the residents try to avoid using brown coal for heating (due to environmental considerations).
Solid waste management:	For organic waste there is an on-site vermicomposting facility. Mulching is practised to improve the soil conditions. The residents are hunting for bulky waste and thrown away plants that may still be useful to them. Thus, they are contributing to waste avoidance. Old car batteries are used as solar batteries, thus avoiding the need to buy new batteries. According to residents, ash is the only residual waste, all other waste streams are collected separately or recycled. There is a “for free box” on-site, where everyone can contribute items that are not needed any longer and others can take it for free.
Implementation data	
Implemented?	yes, since 1991. (orginal location: what is now known as Schlesischer Busch, in 1992 the PUE moved 600 m to current location. In 1996, part of the PUE had to move a bit further away from the river, because a riverside path was created).
Year of construction:	1991 and ongoing
Designer:	no architect involved. The residents built the PUE themselves
Client:	example is embedded in informal setting, thus no contracting authorities are involved.
Executing company:	residents of PUE
Funding:	financed by residents’ personal commitment. Some money is earned by public events. There is also a bank account available for external supporters.

Construction time:	not applicable. As this example is mainly informal and residents are coming and leaving and appropriating their accommodation over time.
Plot ownership:	Owned by Treptow-Köpernick district council. Allegedly, a contract with the district council has been negotiated in recent times, but only for a limited period of 5 years. The living situation remains precarious to some extent, as the plot can be evicted quite suddenly at all times.
PUE-related patents:	
Life cycle aspects	
Expected time of PUE on-site:	unclear. Allegedly, a contract with the district council has been negotiated in recent times, but only for a limited period of 5 years. The living situation remains precarious to some extent, as the plot can be evicted quite suddenly at all times. However, this Wagendorf example already exists since 1991 on Lohmühle location, most likely much longer than expected by all persons involved.
Reversibility:	In the beginning in 1991, the plot was predominantly covered in concrete (as it is at location of the death strip of the former Berlin wall). Over time, the residents transformed it into a green area, planting trees and bushes and improving the soil quality. Thus, the plot might not be reversed into its original status. The living units are reversible, to some degree they are adapted to being movable (as they are mainly trailers - Wagendorf)
Planned reuse/recycling:	If the Wagendorf Lohmühle is evicted at some point in time, the residents will most likely carry their housing units (trailers, sheds, ...) with them.
Potential/planned secondary use concepts for TH-units:	The pop-up units might be reused at a different location, if the Wagendorf has to move at some point. The units will most likely be reused as residential units. However, the majority is already in its secondary use – most of them have been cargo containers, busses or other vehicles before.
Use of reused/recycled materials during construction:	Reused, repurposed truck trailers, busses, wooden constructions (from bulky waste) are used as residential units.
Adaptability:	The PUE is changing and adapting constantly. There are new residents moving in, old residents moving out, bringing and taking away personal belongings and housing units. The surrounding is constantly adapted by the residents to fulfil their needs of comfort, being close to nature and living together in a village-like community.

Innovation aspects:	Unconventional forms of living. The residents define themselves as a project of alternative living with focus on rediscovery of community spirit in urban environments. The objective is to establish a social alternative for urbanism: village structure in large cities. With voluntary choosing a standard of living that is dependent on what nature has to offer, they try to be in harmony with nature and treat it respectfully. The residents have an understanding of themselves as living in a public project which invites and welcomes guests.
Comments & references	
Additional comments:	
Additional references:	Project documentary – Part I and Part II: https://www.youtube.com/watch?v=gvqhyHv1s0I https://www.youtube.com/watch?v=2lOJoLfHlBo Senatsverwaltung für Stadtentwicklung Berlin 2007: Urban pioneers. Berlin: Stadtentwicklung durch Zwischennutzung. Temporary use and Urban Development Berlin. Berlin: jovis Verlag GmbH. S. 98, ISBN: 978-3-939633-28-0 https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

Image 99: Ana Lisa Alperovich, https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

Image 100: Ana Lisa Alperovich, https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

Image 101: Ana Lisa Alperovich, https://inhabitat.com/berlins-wagendorf-lohmuhle-is-a-hidden-self-sufficient-caravan-village/

36. SLEEPBOX MOBILE HOTEL

Project website:

https://www.dezeen.com/2013/02/08/sleepbox-hotel-tverskaya-by-arch-group/

Image 102: Arch group

Project description:

Russian studio Arch Group has filled an old building in Moscow with its portable sleeping capsules to create the first Sleepbox hotel.

Particularities of the Project:

The modular hotel rooms were first developed for travellers taking naps in busy urban environments, but have also allowed Arch Group to convert an awkward building in the city centre into a functioning hotel.

User specific aspects	
User groups:	tourists
Location and environment	
Location:	1-Ya Tverskaya-Yamskaya Ulitsa, 27, Russia

	55.7758 37.5857 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Plot area:	800 m²
Construction type:	Prefabricated box
Foundation type:	No foundations
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Wood, plastics
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1-2
Built area:	4 m²
Area per person:	2-4 m²
Utilities	
Water supply:	not connected to centralised water supply system
Sanitation system:	Showers and toilet cabins are located on each floor and have bright green circular lights on the outside to indicate when they are occupied.
Electricity:	Each Sleepbox is mobile and can be placed anywhere, provided it can be connected to a power source. As well as beds, the rooms are equipped with LED reading lamps, plus sockets for charging laptops and mobile phones.

Implementation data	
Year of construction:	2012
Designer:	Arch group
Executing company:	Arch group
Life cycle aspects	
Repurpose, reuse, new development of site/building:	Reuse of an old building to put Sleepboxes inside.

38. CASA PADRE

Project website:

https://edition.cnn.com/2018/06/14/us/inside-immigrant-children-shelter-brownsville-texas-invs/index.html (news report)

Image 103: Loren Elliott/Reuters

Image 104: https://www.washingtonpost.com/graphics/2018/national/migrant-child-shelters/

Project description:

In a former Walmart superstore building next to the US/Mexican border (Brownsville, Texas), a holding center for undocumented minor migrants was established and is run by the organisation Southwest Key. Due to the implementation of the “zero tolerance” policy of the Trump administration, the capacity of the holding center was exceeded and thus expanded. The living areas are still highly influenced by the structures and features of the former use as superstore.

Particularities of the Project:

The residents (underage boys) don’t have a choice about being in this facility. They are detained.

User specific aspects	
User groups:	1.469 underage boys (10-17 years old), who either crossed into the United States unaccompanied or were separated from their parents at the border. Almost all of them are Central American or Mexican. [1], [5]

Drivers/triggers:	In May 2018, the Trump Administration announced a new “zero-tolerance” border policies, calling for taking away children and prosecuting parents who cross the border with them illegally. [1] In 2017, ”95% of all children detained at the border and transferred to ORR custody were from Honduras, El Salvador and Guatemala, according to data from Customs and Border Protection. Children and families from those countries have been fleeing grinding poverty, gang violence and some of the highest national homicide rates in the world.” [1] The policy of criminally prosecuting all who cross the border illegally is creating an influx of residents for holding centers, minors might be traumatized due to being unexpectedly separated from their mothers and fathers. [4]
Social mix & cohesion:	Almost all of the children in the center are Central American or Mexican. [1]
Gender-sensitive aspects:	The center is housing only boys [1]
User experience:	“The massive shelter retains a warehouse vibe – noisy but highly organized, with scores of staffers leading skeins of boys to various activities.” [1] “They gave us a bit of bread, a nasty egg and some beans and an apple and some milk,” he said, describing breakfast. “Everyone complained about the food.” [4] “You might want to smile,” Southwest Key executive Alexia Rodriguez told the journalists at one point. “The kids feel a little like animals in a cage, being looked at.” [4]
Location and environment	
Location:	3449, 7480 Padre Island Hwy, Brownsville, TX 78521, US 25.9425 -97.4238 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	approx. 6 m
Physical properties	
Site type:	according to Brownsville’s Zoning plan: general retail.

Construction type:	Assumption: prefabricated
Building type:	non-residential building, former superstore
Equipment & facilities:	Rooms have no doors or ceilings. (“children lying in their beds look up past where their walls end to the scaffolding of the superstore roof high above.”) [1] There are no individual cooking facilities, children have to line up for their meals (cantina food). [1, 2] “The bedrooms reporters were shown seemed antiseptically clean” [1] Lights go out at 9 p.m. and come back on at 6 a.m. [4]
Connection to neighboring buildings:	detached (free standing)
Materials used:	Additional walls were constructed to subdivide the former superstore in smaller sections, such as sleeping areas (with no doors), classrooms, recreational, administrative, etc. The main structure of the superstore is still visible: The former Mc Donald’s area is used as cafeteria; the sleeping units don’t have a ceiling. [4]
No. of buildings:	1 big hall (former Walmart superstore) “The bedrooms at Casa Padre are door-less, with walls reaching halfway to a 20-foot-high industrial ceiling that serves as a constant reminder of the building’s past.” [4]
No. of residential units:	313 bedrooms (with no door) [1]
Storey count:	1 floor. The holding center was built inside a former Walmart superstore, which is still visible everywhere. The rooms of children don’t have ceilings. The hall ends in with scaffolding of the superstore roof high above. [1]
No. of persons per unit:	up to 5 (1.469 in total). “Five cot-like beds have been squeezed into bedrooms build originally for four.” (For temporarily boosting capacity). The center is licensed for 1.186 persons. [1]
Built area:	23.225 m² (250,000 square foot shell of former Walmart superstore) [1]
Integration of recreational and/or productive opportunities:	there are recreational rooms, equipped with TVs and video games. There are possibilities to do tai-chi classes, playing football, pool or basketball, as well as table soccer, billiard tables, sofas [1, 2]. The basketball area was formerly used as a garage for Walmart [4]

	Classrooms are integrated into the PUE, the boys attend schools in six-hour morning or afternoon shifts, five days a week. [1] The boys spend almost all their time indoors at the former superstore, aside from one hour a day outside for physical education and another hour of free time they can spend on the basketball courts or soccer fields adjacent to the shelter building. [1] There are telephones available in the shelter (e.g. for calling family members) [1] The boys are allowed to make two phone calls a week [4] (The former parking space seems to be used for some recreational activities.) As can be seen in [2] Medical examination rooms are integrated into the building [4] “Inside, where there was once a McDonald’s, cafeteria workers served chicken, vegetables and plastic fruit cups.” [4] “Casa Padre wasn’t perfect, he said. The two dirt soccer fields behind the big-box store weren’t enough space for all the boys who wanted to play.” [4] There is a barber shop. [4]
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	Details unknown, but the facility is equipped with about 25 restroom areas, evenly distributed around the building. (counted from floor plan given in [3])
Electricity:	Connected to local grid
Solid waste management:	not specified. In videos (e.g. here [4]) there are waste bins visible in the facility. In the cafeteria, there are single-use styrofoam trays and food boxes in use, supposedly leading to high amounts of waste material. Therefore, assumption is: Facility is being connected to municipal solid waste management system.
Implementation data	
Implemented?	Yes
Year of construction:	unknown, when Walmart superstore was constructed. According to historical data on Google Earth, it might have been spring of 2005. The detention center was opened in 2017 [1]

Client:	The Casa padre shelter is operated since March 2018 by the non-profit Southwest Key Programs. [1]
Executing company:	unknown, who initially built the Walmart. The holding center is now run by Southwest Keys Programme. (Presumably, they also initiated the modifications of the former superstore)
Funding:	Southwest Key Programme receives money from the state to operate this (and similar) facilities. “The unusually high number of unaccompanied immigrant children crossing the southern border in recent years has been good for Southwest Key’s business. The organization has received more than $1.1 billion to shelter unaccompanied minors since 2014, including $310 million in the current fiscal year, federal spending records show.” [4]
Construction time:	The Walmart superstore was closed down in 2016.
Life cycle aspects	
Expected time of PUE on-site:	unknown. Unclear, if the repurpose of the former superstore as a holding center can be considered an interim use, or if Southwest Key Programmes is planning to operate it long term. The current living conditions do not really seem appropriate for long term living (no doors, no ceiling in the sleeping rooms).
Reversibility:	The structure of the former superstore is still quite intact, so presumably, it could quite easily be reversed back to being a superstore, if the holding center would one day be put out of business again.
Adaptability:	To accommodate the children in the former Walmart, Southwest Key (the company running the facility) is retrofitting some facilities with smaller bathrooms, smaller sinks, etc. [4]
Comments & references	
Additional comments:	“The boys at Casa Padre stay there and average of 49 days before being placed with a sponsor - usually a relative - reunited with parents or deported.” [1] Procedure of arrival: “They arrive in white vans, half a dozen at a time. After they are fed, clothed and get showered, the boys spend up to 72 hours in “intake” as they are vaccinated and checked for tuberculosis, sexually transmitted diseases and other maladies. Once they are medically cleared, they

	join the throng of boys in the shelter, where they stay for an average of 49 days, according to Southwest Key officials." [4]
Additional references:	[1] CNN investigates. Bob Ortega (2018): What it's like inside the former superstore in Texas where the US is holding 1,400 immigrant children. (updated June 14, 2018) [2] CNN. The Lead with Jake Tapper. Aired on CNN on June 14, 2018; 1.40 pm. [3] The Washington Post (2018): Where are the migrant child facilities? Scattered across America. June 25, 2018. [4] The Washington Post (2018) Inside Casa Padre, the converted Walmart where the U.S. is holding nearly 1,500 immigrant children. June 14, 2018. Report by M. Miller, E. Brown, A. Davis [5] Hayley Peterson, Business Insider (2018): Walmart blasts Trump administration's "disturbing" detainment of migrant children in one of its former stores. June 20, 2018. Zoning plan

Image 105: Department of Health and Human Services

Image 106: Department of Health and Human Services

39. BIBBY CHALLENGE

Project website:

https://www.welt.de/print-welt/article395352/Hamburg-schliesst-Wohnschiff-fuer-Fluechtlinge.html

Image 107: https://www.shipphotos.co.uk/ship/?ship=bibbychallenge

Project description:

Refugee accommodation on a vessel. In German, the project was titled “Altonaer Flüchtlingsschiffe”.

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	demand of accommodation for asylum seekers
User experience:0	ex-resident states that it was dirty and overloaded (Source: NDR)
Location and environment	
Location:	Hamburg, close to Fischmarkt
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate

Sea level:	around sea level
Physical properties	
Site type:	(water area)
Plot area:	approx. 2.484 m² (92x27m)
Construction type:	Prefabricated containers on ship transported via tugboat
Building type:	building (more than 2 units per building)
Weather resistance:	not specified; assumption: weather resistant to local weather conditions
Equipment & facilities:	There is also a large kitchen and restaurant, bar, gym, laundry facilities and relaxation and games areas. sanitary facilities (Not clear, whether for each unit) laundry room (Presumably) (Source: Bibby Maritime)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Containers, among others
No. of buildings:	1 (Total of 4 boats in Hamburg used as Initial reception center)
No. of residential units:	Assumption: 337, according to Bibby Maritime
Storey count:	4
No. of persons per unit:	up to 8 (Source: Youtube) in times of need even 14 persons/unit (Source: Neues Deutschland)
Built area:	approx. 2.484 m² (92x27m)
Area per person:	not specified; size of unit 11-12 m² for 8-14 persons
Integration of recreational and/or productive opportunities:	not specified; assumption: there is a dining hall
Utilities	

Water supply:	Assumption: Connected to centralised water supply system
Sanitation system:	"Sewage System: The revolutionary 'SludgeHammer™' sewage treatment system is installed, so overboard discharge is safe and environmentally friendly, and waste tanks are cleared in a matter of days." (Source: Bibby Maritime PDF) Assumption: connected to municipal network
Electricity:	"There are 4 x 240kW generators, 380V, 50 cycles, 3 phase." (Source: Bibby Maritime PDF) Assumption: connected to municipal network
HVAC:	"All rooms, public areas and restaurant are fully air conditioned by stand-alone units. A HVAC system is also provided in the alleyways and galley. Mechanical exhaust ventilation is provided in all bathrooms and toilets throughout the Coastel, and the Air Conditioning can also provide heating through the Coastels as well as cold air." (Source: Bibby Maritime PDF)
Solid waste management:	not specified; assumption: connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	1993
Designer:	Bibby Maritime Limited
Client:	Assumption: City of Hamburg
Executing company:	Bibby Maritime Limited.
Funding:	Assumption: funded by city-state of Hamburg
Life cycle aspects	
Expected time of PUE on-site:	removed in 2006 (or earlier, according to welt.de)
Planned reuse/recycling:	the whole ship gets reused; used to shelter workers on Shetland Islands (Source: shetlandtimes.co.uk)
Comments & references	

Additional references:	https://www.ndr.de http://www.bibbymaritime.com/ (1) http://www.bibbymaritime.com/ (2) http://www.bibbymaritime.com/ (3) http://www.bibbymaritime.com/ (PDF) https://www.youtube.com/watch?v=xVFeiOF77fc https://www.neuesdeutschland.de/ https://www.welt.de/print-welt/article395352/Hamburg-schliesst-Wohnschiff-fuer-Fluechtlinge.html https://www.shetlandtimes.co.uk/2014/12/20/ocean-endeavour-sails-off http://wohnschiffprojekt.blogsport.eu/geschichte/ http://bibbymaritime.tv/challenge/floorplan.html

40. MAGDAS HOTEL

Project website:

https://www.magdas-hotel.at/

Image 108: https://www.magdas-hotel.at/

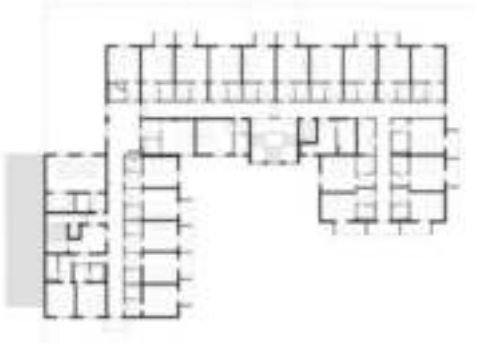


Image 109: http://www.awg.at/de/project/hop-d/

Project description:

Former retirement home repurposed as accommodation for young unaccompanied refugees and tourists

Particularities of the Project:

social mix of residents plus social business (migrants working in the hotel)

User specific aspects	
User groups:	mainly tourists, also a group of young unaccompanied refugees
Drivers/triggers:	initiative by Caritas
Social mix & cohesion:	young unaccompanied refugees living in the same building as tourists; migrants working in hotel
Location and environment	
Location:	Laufbergergasse 12, Wien 48.2131 16.3966 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal

Climate:	Continental
Physical properties	
Site type:	residential area
Plot area:	2.341 m²
Construction type:	built on site
Foundation type:	non-reversible foundation
Building type:	building (more than 2 units per building)
Equipment & facilities:	Kitchen - Restaurant wooden platform and tables with chairs and garden beds in open space
Connection to neighboring buildings:	duplex (one side linked to another house/building)
Materials used:	Assumption: bricks, concrete
No. of buildings:	1
No. of residential units:	1 shared flat for 25 unaccompanied refugees plus 78 hotel rooms
Storey count:	5
No. of persons per unit:	Assumption: Approx. 2
Built area:	1.292 m2 (GFA: 6.460 m²)
Integration of recreational and/or productive opportunities:	working place for 30 people; garden beds
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid

Solid waste management:	connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	repurposed in 2015; originally built presumably in the 1970s
Designer:	Alleswirdgut Architektur
Client:	Caritas Erzdiözese Wien
Executing company:	Berlinger Bau GmbH
Cost of construction:	1,55 Million Euro
Funding:	funded by Caritas and donations
Plot ownership:	not specified; assumption: city of Vienna
Life cycle aspects	
Use of reused/recycled materials during construction:	furniture is reused
Adaptability:	has been adapted from retirement home to hotel and refugee accommodation
Repurpose, reuse, new development of site/building:	Adaption of former retirement home to hotel/restaurant run as social business
Innovation aspects:	social business (20 out of 30 workers are migrants)
Comments & references	
Additional references:	http://www.awg.at/de/project/hop-d/

41. GRAND HOTEL METROPOLIS

Project website:

https://grandhotel-cosmopolis.org/de/hotel/

Image 110: https://www.augsburger-allgemeine.de/augsburg/Dem-Grandhotel-Cosmopolis-droht-das-Aus-id52600141.html

Project description:

A former home for the elderly: Paul-Gerhardt-Haus, Diakonie used to host refugees and tourists/travelers

Particularities of the Project:

Hotel/hostel: guests pay as much as they want/can

“In addition to the above-mentioned offers, this project provides the following synergistic effects as a result of its special conditions:

- Augsburg can be true to its motto of “Friedensstadt” (city of peace).
- As a cultural institution, it enriches urban cultural life in a unique way.
- The normal hotel operations facilitate networking with the world. It is essential for a city like Augsburg to be in a position to provide simple and individual accommodation.

Interaction between hotel residents with and without asylum will deliberately stimulate discussion of this topic and create possibilities for cultural exchange. Participation: This is the basis for the entire project. The “Grandhotel” will only be able to exist through active articipation. For culturally engaged individuals, the incentive will be the rent-free housing. Hotel residents with asylum status can become involved based on their personal possibilities in the cultural activities and hotel operations going on during their stay/residence. Hotel guests who are in transit will experience their stay as part of a unique project. The mixed system of participation and consumption can give rise to surprising novel “services”, such as those that were common in the Grands Hotels of years gone by.” (Source: https://grandhotel-cosmopolis.org/ (PDF))

User specific aspects	
User groups:	asylum seekers, hotel and hostel guests, social engaged people, activists, neighbours, etc. “The project strives to concentrate energies and positively interlink diverse fields of interests. We expect three different user groups to fill the space with life and interact with one another. The creative minds: Several workspaces and studios are planned for the ‘Grandhotel’ because many individuals involved in cultural activities in this city have expressed the wish to have a lively place of exchange where they can work, live, and perform. Use of the offices does, however, have to be compatible with the character of the hotel. This means noisy workspaces or rehearsal rooms for bands are out of question. The tenants of these office rooms are startups (creative minds who are trying to make a living from art as small-scale entrepreneurs or artists), who only will be provided with a room if they are willing to participate in the internal exchange within the hotel. This will be the key criterion in the distribution of the spaces. The artists are also expected to contribute special offers for the functioning of the hotel. The incentive for the artists is the rent-free accommodation. Within this context, there is also a plan to establish a free academy that offers the opportunity to organise workshops and seminars for already existing as well as newly formed networks. Cooperation with art academies and universities is also under discussion. Hotel residents with asylum: 50 – 60 individuals: families, unaccompanied minors, women and men should live as guests of the hotel on three floors in the centre of the building. They have their own separate parts of the building for themselves including bedrooms, kitchens, bathrooms, toilets, and lounges. The accommodation of the asylum seekers is based on the clearly improved “Leitlinien zu Art, Größe und Ausstattung von Gemeinschaftsunterkünften für Asylbewerber” (guidelines for type, size, and equipment of common accommodation for asylum seekers) of the “Bayerisches Staatsministerium für Arbeit und Sozialordnung, Familie und Frauen” (Bavarian State Ministry of Employment and Social Order, Family and Women). Hotel residents without asylum: This group is most likely to be comparable with the user groups for urban hostels. There are various user profiles: o international travellers and cultural travellers: The goal is to more widely promote Augsburg as a potential destination for international backpackers. We want to attract travellers to Augsburg on their way through Europe and thus also contribute to the fame of the town. o Artists appearing in the city The “Grandhotel” should offer inexpensive and charming possibilities for event organisers to host foreign artists

	○ newly-arrived Augsburg residents searching for an apartment Thanks to its central location, the "Grandhotel" can serve as a starting point for people who want to get their bearings in Augsburg while looking for somewhere to live. In this regard, we are thinking of the students at the two universities looking for accommodation. As a result of the double class that was graduating in 2011, still a larger number of students can be expected in the city." (Source: https://grandhotel-cosmopolis.org/ (PDF))
Drivers/triggers:	"The owner would like to "keep" the building but has no concrete use for it. Standing vacant, it incurs costs without providing any benefits. Many culturally engaged individuals in the city would like to have somewhere they can use as a lively place of exchange for housing, living, and performing. The city government urgently needs accommodation for the increasing number of asylum seekers, and intends to use the building to accommodate asylum seekers. The surrounding area is afraid that this will devalue the neighbourhood. Along with other institutions (Caritas, Tür-an-Tür), the Diakonie provides social support and acts as a "lawyer" for asylum seekers and refugees in the field of refugee counselling, and so it considers itself responsible for helping to provide suitable accommodation for asylum seekers." (Source: https://grandhotel-cosmopolis.org/ (PDF))
Social mix & cohesion:	"Participation as fundamental principle: Participation is the foundation of the entire project. The "Grandhotel" will only be able to exist through active participation. For culturally engaged individuals, the incentive will be the rent-free housing. Hotel residents with asylum can become involved based on their personal possibilities in the cultural activities and hotel operations going on during their stay/residence. Hotel guests who are in transit will experience their stay as part of a unique project. The mixed system of participation and consumption can give rise to surprising novel "services", such as those that were common in the Grands Hotels of years gone by. Barter adds another incentive for local residents to get involved, to bring their own ideas into being, or to donate materials or equipment. Our "Tauschmarken" (barter currency) comes for instance in the form of meal vouchers, free tickets for cultural events, or a pair of strong hands to help carry a washing machine onto the second floor – you scratch my back, I'll scratch yours. All of this gives rise to perceptible, emotional bonds, and to acceptance and identification with the location. Open communication, transparency, and interaction: The process-oriented approach requires communication. Experience gained in the earlier projects has shown that open and simple communication via social networks such as Facebook can lead to a large mobilisation of engaged and creative individuals. Since one of the goals of the project is

	also to become a part of the “Cathedral City” living environment, a place for real communication will be developed through the “showroom” – later the lobby. This is where – even prior to the actual construction work – insight will be given into how the location will change. For this purpose, the future entrance area of the lobby will be remodeled and redesigned. The project will be presented here, and printed flyers about the project and its aims displayed. In addition, this space will serve as a starting point for informational events in the early phase of the hotel. The creative minds who are first to move into the offices / studios will by virtue of being part of the project’s development become communicators of its idea to various sections of society. Through this we want to create a sense of anticipation and excitement about the development of the project. For the opening of the restaurant, the idea is to start a media campaign to appeal to local residents, interested individuals, and sympathizers to bring tableware donations as an opening gift. These dishes will later be used in the restaurant. Use of resources in a throwaway society: A fundamental premise of the entire project is to move away from the mechanisms of a throwaway society through the way it operates and the equipment it uses. The furnishings of the “Grandhotel” will consist of second-hand furniture. The restaurant will not use one specific type of tableware. The building’s central rooms are intended for multiple uses. The resource of “culture” should become one of its mainsprings. Creativity, ideas, and engagement become essential resources for the whole idea. In many areas, they even replace a flow of cash.” (Source: https://grandhotel-cosmopolis.org/ (PDF))
Location and environment	
Location:	Springergässchen 5, Augsburg, Germany 48.3727 10.9001 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	residential area (Source: https://geoportal.augsburg.de/ (PDF))

Plot area:	900 m² (Source: https://geoportal.augsburg.de/)
Construction type:	built on site
Foundation type:	not reversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	restaurant, kiosk-café, garden (The grounds include two gardens that will be worked in the style of an intercultural urban district garden, serving as a source of ingredients for the restaurant. In the future, the plan is to convert the two large flat roofs into additional planting space) and playground (an open and lively playground in the large garden behind the “Grandhotel” facilitates interaction between local families with children and hotel guests. This garden should be integrated within the planning of the outdoor areas.)
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Assumption: concrete
No. of buildings:	1
No. of residential units:	not specified; hotel: 12 double rooms and 4 rooms with more beds; additionally 65 asylum seekers accommodated
Storey count:	one part with 4 floors, one part with 7 floors
Built area:	470 m² (Source: https://geoportal.augsburg.de/)
Integration of recreational and/or productive opportunities:	see above
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
Solid waste management:	connected to network
Implementation data	

Implemented?	Yes
Year of construction:	2013
Client:	Diakonie
Funding:	asylum seekers' stay is paid for by the government; hotel guests pay as they wish; donations, volunteer work force
Plot ownership:	Diakonie
Life cycle aspects	
Expected time of PUE on-site:	Planned interim solution for 10 years (Source: https://grandhotel-cosmopolis.org/ (PDF))
Innovation aspects:	social mix; guests pay as much as they can
Comments & references	
Additional references:	https://grandhotel-cosmopolis.org/ (PDF) https://geoportal.augsburg.de/ https://geoportal.augsburg.de/ (PDF)

42. HAUS DÖBLING

Project website:

www.google.com

Image 111: Rüdiger Lainer + Partner

Image 112: http://www.dachwohnungen-haus-doebling.at/

Project description:

Unoccupied apartments on top of the retirement home are rented to refugees

Particularities of the Project:

the retirement home is still in use; the apartments were meant to be rent to people who can afford it; there was too little demand, the City is paying for hosting refugees

User specific aspects	
User groups:	refugees; elderly people
Drivers/triggers:	high demand of living space for migrants
Social mix & cohesion:	living together elderly people + refugees; 2 kindergartens, doctor's practices, a coffee shop
Location and environment	
Location:	Grinzinger Allee 26, 1190 Wien, Austria 48.2491 16.3428 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	13.947 m² (Source: wien.gv)
Plot area:	residential area
Construction type:	prefab concrete
Foundation type:	assumption: not reversible
Building type:	building (more than 2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	concrete
No. of buildings:	1
No. of residential units:	52 apartments on top of the retirement home (where the refugees are hosted); space for 224 persons (in-patient), 28 single units (living units for elderly who are still independent) (Source: kwp.at)
Storey count:	parts with 4, 5 and presumably 6 floors
Built area:	approx. 7.932 m² (Source: wien.gv) total GFA: 36.800 m² (Source: lainer.at)
Area per person:	not specified; the apartments have a size between 30 and 60 m2 (3 different types)
Integration of recreational and/or productive opportunities:	”Fittingly for spring, team leader Erzsébet Szakszon-Gross had the idea of getting all the house residents under one roof with a joint planting campaign. Among them are 25 refugee families who have been living there since September 2015, as well as the staff of Haus Döbling. ”Our refugees have painted 50 wooden pallets and prepared them with foil, and today the joint planting of our 30 balconies begins,” says Director Karl Pichler-Bittner happily. Also the large plant troughs in the garden are being decorated,

	because soon herbs and vegetables will be grown there in addition to flowers." (Source: meinbezirk.at) "Located in a residential area close to the Vienna woods the outdoor spaces of the nursing home mirror different types of Austrian regions: like a filmstrip of landscapes from flat lake areas, forest plateaus and hilly vineyards to alpine gardens. This panorama evolves in an unobtrusive way - a kind of storyboard of memories familiar to the elderly residents." (Source: auboeck-karasz.at)
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
Implementation data	
Implemented?	Yes
Year of construction:	2012
Designer:	Rüdiger Lainer + Partner
Client:	Kuratorium Wiener Pensionisten-Wohnhäuser
Executing company:	
Cost of construction:	
Funding:	State funded
Construction time:	4 years
Plot ownership:	Probably Kuratorium Wiener Pensionisten-Wohnhäuser or City of Vienna
Life cycle aspects	
Innovation aspects:	elderly people and refugees living together in the same building
Comments & references	

Additional comments:	
Additional references:	https://www.youtube.com/watch?v=HkOQprJ4ds8 https://www.kwp.at/Doebling.aspx https://www.lainer.at/projekte/iwp/ https://www.meinbezirk.at/doebling/c-lokales/fluechtlinge-und-senioren-gemeinsam-garteln-im-haus-doebling_a2526057 http://www.auboeck-karasz.at/project/nursing-home-dobling https://www.fluechtlingshilfe-kwp.at/informationen.aspx

43. FLÜCHTLINGSWOHNHEIM ZIETENTERRASSEN, GÖTTINGEN

Image 113: Datenbank Flüchtlingsunterkünfte

Image 114: Datenbank Flüchtlingsunterkünfte

Project description:

3 houses host 180 refugees for approx. 5 years

User specific aspects	
User groups:	refugees waiting for asylum
Drivers/triggers:	high demand
Location and environment	
Location:	Hannah-Vogt-Straße 5, 37085 Göttingen, Germany 51.5203 9.9722 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Continental
Physical properties	
Site type:	Residential
Plot area:	approx. 6.500 m² (Source: Google Maps)
Construction type:	Prefabricated steel frame room modules.

	For reasons of timely a modular construction of steel frames was planned. In three buildings of three storeys each with access via staircases and arcades, 30 apartments and a communal area were created.
Foundation type:	not specified; assumption: reversible
Equipment & facilities:	units have bathroom with washing machine connection and kitchen
Weather resistance:	The individual modules consist of a thermally insulated steel frame construction with F30 fire protection rating.
Connection to neighboring buildings:	
Materials used:	Assumption: steel, concrete
No. of buildings:	3
No. of residential units:	30
Storey count:	3
No. of persons per unit:	6
Area per person:	not specified; 1 apartment 62 m² = approx.10 m²/person
Integration of recreational and/or productive opportunities:	Common areas: 180 m² of common areas. This area includes offices for social services and janitors, a childcare room, recreation room for teenagers and sanitary and kitchen area for the common area. Outdoor facilities: playground for small children and open spaces with seating, covered areas for laundry, bicycle parking, parking spaces for cars, enclosed garbage cans. “The green outdoor area has been equipped with seating areas, children’s playground equipment and a ball playground. Outdoor lighting is provided by pole lights as well as wall-mounted lights. A neighboring sports club has built a covered sports area next door to provide a wide range of play, sports and meeting facilities.”
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system

Electricity:	Connected to local grid
HVAC:	“The heating of the complex is provided by district heating, the hot water supply is decentralized via flow heaters.”
Solid waste management:	not specified; assumption: connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	Stadt Göttingen, Fachdienst Hochbau, Klimaschutz und Energie, Bernhard Boy, Göttingen
Client:	Stadt Göttingen, Fachbereich Gebäude
Executing company:	Firma Gerlach Schlüsselfertigbau GmbH & Co. KG, Einbeck
Cost of construction:	1.503 Euro/m² BGF - Total: ca. 1.400.000 Euro (net) 4,5 million euros according to hna.de
Funding:	state funded
Construction time:	Some months
Plot ownership:	City of Göttingen (Source: hna.de (2))
Life cycle aspects	
Expected time of PUE on-site:	5 years
Comments & references	
Additional comments:	apparently the neighbourhood and the sports club collaborate in taking care for the residents (Source: hna.de (2))
Additional references:	Zoning plan hna.de hna.de (2)

44. LEICHTBAUHALLEN HARDTGENBUSCHER KIRCHWEG, KöLN

Project website:

http://www.winostheim.koeln/wp/wordpress/2016/02/25/leichtbauhalle-bereits-belegt/

Image 115: Google Earth

Image 116: https://www.stadt-koeln.de/mediaasset/content/pdf56/2015-11-17_infoveranstaltung_ostheim__neu_.pdf

Project description:

6 light weigh halls host up to 400 refugees (in 5 halls) plus 1 hall for dining and meeting

- 372 places
- in the beginning there where only bunk beds, then came dividing walls
- Social work advice and support from the German Red Cross with the aim of integrating both the residents and the houses into the surrounding social environment
- Cooperation with Youth Welfare Office, School Authority (registration of children of compulsory school age), Social Welfare Office, Foreigners' Registration Office, welfare organizations, independent organizations, initiatives, churches, police, and many citizens working on a voluntary basis (welcome initiatives)
- Networking with other social services in the district and social space
- Red cross is taking care of residents

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	high demand in 2015
Location and environment	
Location:	Hardtgenbuscher Kirchweg, Ostheim, 51107 Köln, Germany 50.9258 7.0482 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	Community lot (“Gemeindebedarfsfläche”)
Plot area:	approx. 16.000 m² (measured on Google Earth)
Construction type:	Assumption: light weight hall - frame construction with PV panels
Foundation type:	Not specified. Assumption: no foundation
Building type:	building (more than 2 units per building)
Equipment & facilities:	each hall contains shared sanitary facilities; one hall is used for dining and gathering every resident has a bed (and presumably a locker)
Connection to neighboring buildings:	detached (free standing)
Materials used:	steel, PVC, etc.
No. of buildings:	6
No. of residential units:	space for 400 bunk bed spots
Storey count:	1
Built area:	7.500 m² (6 halls of 15 m * 50 m)
Integration of recreational and/or productive opportunities:	playground on the lot
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system

Electricity:	Assumption: connected to local power grid
Solid waste management:	Assumption: connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	2015 or 2016
Client:	Assumption: City of Köln
Funding:	State funded
Construction time:	Some months
Life cycle aspects	
Expected time of PUE on-site:	initially 3 months; it lasted until 2018
Reversibility:	Reversibility of area: “The lightweight halls will be dismantled again after the period of use, and the area will be restored to its original condition. The sites in Ostheim and Mülheim will be used as accommodation reserves in the medium term after the last persons have moved out.” (Source: stadt-koeln.de (3))
Comments & references	
Additional references:	https://www.stadt-koeln.de/mediaasset/content/pdf56/2015-11-17_infoveranstaltung_ostheim__neu_.pdf https://www.stadt-koeln.de/ (1) https://www.report-k.de/Koeln-Nachrichten/Koeln-Nachrichten/Stadt-Koeln-Keine-Fluechtlinge-mehr-in-Leichtbauhallen-101439 https://www.stadt-koeln.de/ (2) https://www.rheinischeanzeigenblaetter.de/mein-blatt/koelner-wochenspiegel/kalk/mehr-privatsphaere-100-kojen-in-leichtbauhallen-eingebaut-25146832 https://www.stadt-koeln.de/ (3)

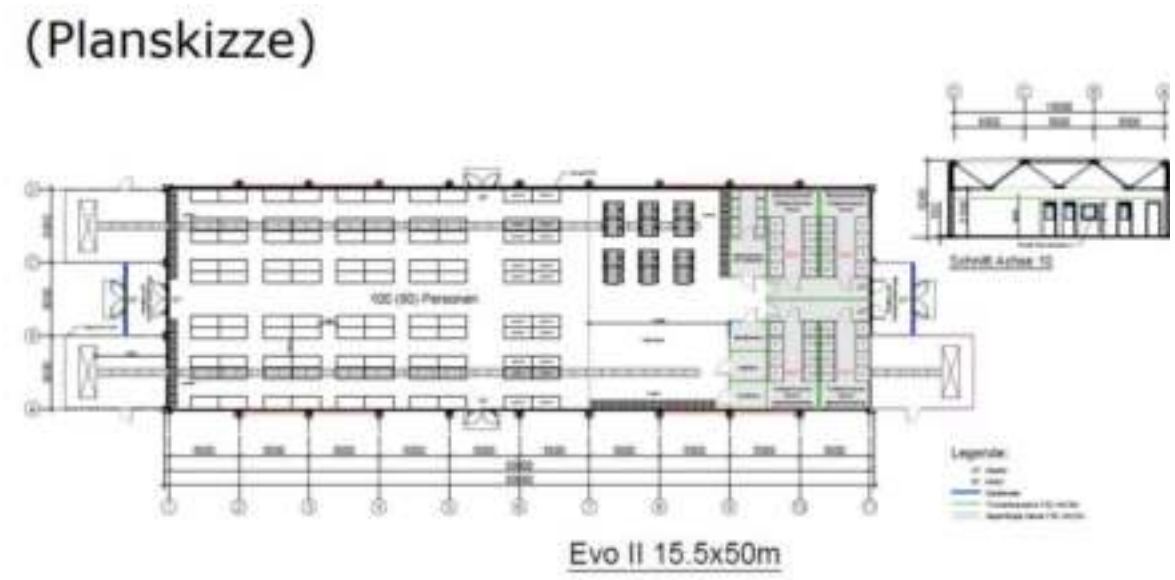


Image 117: https://www.stadt-koeln.de/mediaasset/content/pdf56/2015-11-17_infoveranstaltung_ostheim__neu_.pdf

45. BARRIO ZENOBIO LOPEZ, LA PAZ

Project website:

https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620334/rr-bolivia-resilience-iterative-processes-300817-en.pdf

Image 118: Oxfam/Fundepco, http://ec.europa.eu/echo/files/policies/prevention_preparedness/DRR_thematic_policy_doc.pdf

Image 119: European Commission, https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620334/rr-bolivia-resilience-iterative-processes-300817-en.pdf

Project description:

Temporary shelter in form of single detached houses to host people that were evacuated before a landslide happened

Particularities of the Project:

built by various organisations (IRFC, Oxfam, Fundepco; presumably: un techo para mi pais)

User specific aspects	
User groups:	families affected by disasters
Drivers/triggers:	forecast of landslide
Social mix & cohesion:	a whole neighbourhood got evacuated; not specified if they where put together in the same camp or distributed a across different locations
Location and environment	
Location:	Camp Zenobio Lopez, Av. René Zavaleta, La Paz, Bolivia

	-16.5062 -68.1159 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Dry (desert / semi-arid)
Sea level:	approx. 3.640 m
Physical properties	
Site type:	not specified; assumption green land or vacant building land
Construction type:	prefabricated elements
Foundation type:	assumption: reversible foundation
Building type:	house (1-2 units per building)
Weather resistance:	
Equipment & facilities:	shared kitchen; WASH Area (Water, Sanitation, Hygiene)
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood, corrugated iron
No. of buildings:	38 units, additionally buildings for WASH, administration and kitchen
No. of residential units:	28
Storey count:	1
No. of persons per unit:	Family
Utilities	
Water supply:	Assumption: water trucking to tank or connected to centralized water supply
Sanitation system:	Assumption: septic tank (because it’s common in the country)

Electricity:	Assumption: connected to centralized supply
Implementation data	
Implemented?	Yes
Year of construction:	2011
Designer:	not specified; houses look similar to models by “un techo para mi pais”
Client:	Assumption: Municipality
Funding:	Assumption: donations, state funded
Plot ownership:	Assumption: municipal
Life cycle aspects	
Innovation aspects:	not specified; for Bolivia the innovation was maybe that the government acted preventively before the disaster occurred
Comments & references	
Additional references:	http://ec.europa.eu/ (PDF) https://oxfamilibrary.openrepository.com/

46. ELEONAS REFUGEE CAMP

Project website:

https://data2.unhcr.org/en/documents/download/53941

Image 120: https://www.thenationalherald.com/165105/tnh-visits-eleonas-refugee-camp-athens/

Image 121: Google Earth

Project description:

refugee camp of containers; apparently it was free access in the beginning (residents could leave and enter the PUE whenever they wanted) but is not anymore.

User specific aspects	
User groups:	migrants; affected by violence; asylum seekers (in Greece or travelling through)
Drivers/triggers:	large demand; migration crisis
Social mix & cohesion:	not specified; residents coming from different countries: 55% Afghanistan, 35% Syria, 10% Other
User experience:	Child reports that she is not so happy (Source: youtube.com)
Location and environment	

Location:	Agiou Polikarpou 87, Athina 118 55, Greece 37.9827 23.6987 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	25 m
Physical properties	
Site type:	Assumption: industrial
Plot area:	44.000 m²
Construction type:	Pre-fabricated: containers
Foundation type:	Reversible
Building type:	house (1-2 units per building)
Weather resistance:	not specified; according to UNHCR, less people should be hosted in winter times (1430)
Equipment & facilities:	industrial kitchen; washing is included in unit; internet connection: WIFI, Child-friendly space is not appropriate (Source: UNHCR)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Containers
No. of buildings:	206
Storey count:	1
No. of persons per unit:	cabin for 8 persons (Source: vr4.info) Calculation results in up to 10: PUE population estimated approx. 2000 persons;
Built area:	not specified; Assumption; approximately half of total area
Integration of recreational	not specified; playground not appropriate (UNHCR)

and/or productive opportunities:	
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	supplied with electricity (Source: UNHCR)
Solid waste management:	yes (Source: UNHCR)
Implementation data	
Implemented?	Yes
Year of construction:	2015
Client:	Municipality of Athens
Funding:	Assumptions: municipal/stately funded, donations
Construction time:	Not specified; assumption: very quick
Plot ownership:	The site was provided by the Municipality of Athens under four conditions (Source: medium.com)
Comments & references	
Additional comments:	
Additional references:	https://www.thenationalherald.com/165105/tnh-visits-eleonas-refugee-camp-athens/ https://www.youtube.com/watch?v=0rGCj-1B-bA https://data2.unhcr.org/en/documents/download/53941/ https://v4r.info/place.list.php?ID=216 https://medium.com/athenslivegr/doyouremember-when-eleonas-refugee-camps-was-a-construction-site-7ba489c1eb8b

Image 122: UNHCR, https://data2.unhcr.org/en/documents/download/53941/

47. TEMPOHOMES ZOSSENER STRASSE, BERLIN

Project website:

https://www.berlin.de/laf/wohnen/allgemeine-informationen/tempohomes-faq/

Image 123: https://www.ejf.de/einrichtungen/migration-und-fluechtlingshilfe/wohnheim-fuer-fluechtlinge-zossener-strasse.html

Image 124: Google Maps

Project description:

The shared accommodation in modular construction, which was occupied in mid-October 2016, offers space for up to 280 people. On a total plot size of 15,735 m2, there are currently communal raised beds, a volleyball court and communally built seating facilities. There is sufficient space here to envisage further outdoor terrain planning for recreation, sports and games, and open spaces for exercise.

User specific aspects	
User groups:	refugees, asylum seekers
Drivers/triggers:	Demand
Social mix & cohesion:	Volunteers who had already assisted the refugees in the gymnasiums helped with the move. Before moving into the Tempohomes, surrounding institutions, such as children from the Pusteblume Elementary School, beautified the grounds with flowerpots. Nothing is allowed to be planted in the ground. (Source: berliner-woche.de) ○ The district centers, which are funded by the state of Berlin, are tasked with meeting the neighborhood's need for education and information and coordinating volunteer efforts to support refugees. For example, the district centers moderate events for residents or accompany the arrival of refugees in the respective neighborhood. They maintain contact with volunteer

	networks and helpers in the district and initiate and promote projects. In order to strengthen the refugee work of the district centers, €600.000 per year was made available for this purpose in the 2016/17 state budget ○ In the districts where a neighborhood management system financed by the Senate Department for Urban Development and the Environment has already been set up, this also promotes social integration through specific projects in the district. ○ In addition, the state of Berlin has made available 1mln euros to each district for integration measures. A refugee coordinator has been appointed in each district as a contact person for information and residents' concerns. In some districts, this task is performed by a volunteer coordinator. (Source: berlin.de)
Location and environment	
Location:	Zossener Straße 138, Hellersdorf, Berlin 52.5438 13.5949 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Sea level:	60 m
Physical properties	
Site type:	unused area; green field; residential development area (Source: fbinter.stadt-berlin.de)
Plot area:	Approx. 15.000 m² (Source: berlin.de)
Construction type:	Prefabricated modules, containers
Foundation type:	not specified; assumption: reversible concrete foundation
Building type:	house (1-2 units per building)
Weather resistance:	Assumption: water resistant

Equipment & facilities:	Each accommodation unit is independent and consists of three rooms: In the center is the entrance room with the pantry-kitchen and an enclosed area behind it with a shower cubicle and toilet. To the right and left of the entrance room there is a bedroom for two persons. After staying in emergency shelters with limited privacy and canteen food, this finally gives people a smaller living unit where they can close a door behind them and cook for themselves and their family. The apartments will be equipped with beds, wardrobes, chairs, tables, linens, and cooking and eating utensils. In addition, there are administrative, utility and community buildings at each Tempohome site. The administration building houses the operator's offices, counseling rooms, staff lounges, storage rooms, and an appropriately equipped janitorial workshop. In the utility building there are washing machines and dryers for residents to use themselves. In the community building there are children's playrooms, school study rooms, a PC room and common rooms, e.g., for social gatherings, courses or festivities. This is part of the quality requirements of the LAF (Berlins' migration authority). (Source: berlin.de)
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Containers
No. of buildings:	80
No. of residential units:	80
Storey count:	1
No. of persons per unit:	4
Built area:	Approx. 3.120 m² (80m x 3m x 13m)
Area per person:	approx. 10 m²
Integration of recreational and/or productive opportunities:	on the picture is a community garden with high raised beds - apparently it is not allowed to be cultivated (Source: berliner-woche.de) Play and recreation areas with sandboxes, playground equipment and benches, similar to a public children's playground, will be created on the open spaces of each site. Ball play areas and garden areas with plant pots for residents to decorate themselves are also planned.

Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: connected to local power grid
HVAC:	Assumption: electrical heating available, see Image 125.
Solid waste management:	Assumption: connected to network
Implementation data	
Implemented?	Yes
Year of construction:	2016
Client:	BIM; the container village is run by EJF (Source: ejf.de)
Executing company:	The developer on behalf of the state of Berlin is the state-owned Berliner Immobiliengesellschaft (BIM). Compared to conversions of existing real estate, residential container villages have the advantage that they can be built relatively quickly, that they belong to the state of Berlin and are located on state-owned land.
Funding:	State funded
Construction time:	5 months (Source: berliner-woche.de)
Plot ownership:	not specified; Could be property of city
Life cycle aspects	
Expected time of PUE on-site:	3 years (Source: berlin.de)
Comments & references	
Additional comments:	
Additional references:	https://www.berlin.de/laf/wohnen/allgemeine-informationen/tempohomes-faq/

	https://www.ejf.de/einrichtungen/migration-und-fluechtlingshilfe/wohnheim-fuer-fluechtlinge-zossener-strasse.html https://fbinter.stadt-berlin.de/fnp/index.jsp?Szenario=fnpak https://www.berliner-woche.de/hellersdorf/c-soziales/asylbewerber-beziehen-tempohome-in-der-zossener-strasse_a111146

Image 125: https://www.berlin.de/laf/wohnen/allgemeine-informationen/tempohomes-faq/

48. APARTMENTHAUS LEOPOLDSTADT

Project website:

https://www.mein-wien-apartment.at/Apartment-in-Wien/Apartmenthaus-Leopoldstadt#&gid=1&pid=1

Image 126: https://www.mein-wien-apartment.at/Apartment-in-Wien/Apartmenthaus-Leopoldstadt#&gid=1&pid=1

Project description:

apartment building with small flats: renting duration from 7 months to 3 years

Particularities of the Project:

organized by “Mein Wien-Apartement” - Fonds für temporäres Wohnen in Wien (Vienna’s public fund for temporary housing)

User specific aspects	
User groups:	Housing for people in precarious housing situations (Source: wien.gv.at)
Drivers/triggers:	need of temporary housing
Social mix & cohesion:	students/working people (Source: https://www.mein-wien-apartment.at/So-funktionierts)
Location and environment	
Location:	Schiffamtsgasse 14, 1020 Wien

	48.2191, 16.3750 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	building land (residential area)
Construction type:	on site
Foundation type:	Irreversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	fully furnished; private kitchen, bathroom, toilet
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
No. of buildings:	1
No. of residential units:	22
Storey count:	7 plus attic
No. of persons per unit:	maximum 2
Area per person:	housing units range from 20 m² to 31 m²
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
Solid waste management:	municipal
Implementation data	

Year of construction:	After 1945
Client:	Vienna's public fund for temporary housing
Plot ownership:	private (fund?)
Life cycle aspects	
Comments & references	
Additional comments:	affordable living : rent = € 325,00 to € 410,00 (incl. taxes and utilities)
Additional references:	https://www.wien.gv.at/sozialinfo/ https://www.mein-wien-apartment.at/So-funktionierts

49. APARTMENTHAUS DORNBACH

Project website:

https://www.mein-wien-apartment.at/Apartment_in_Wien/Apartmenthaus_Dornbach

Image 127: https://www.mein-wien-apartment.at/Apartment_in_Wien/Apartmenthaus_Dornbach

Image 128: https://www.mein-wien-apartment.at/Apartment_in_Wien/Apartmenthaus_Dornbach

Project description:

Free-standing permanent building for temporary housing use

Particularities of the Project:

On the back side of the building, a grandstand of the adjacent football court is attached

User specific aspects	
User groups:	students, workers, people in temporary housing need
Social mix & cohesion:	above mentioned groups living in the same building
Location and environment	
Location:	Hernalser Hauptstraße 214–216, 1170 Wien 48.2255 16.3106 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental

Physical properties	
Site type:	mixed building area (“Gemischtes Baugebiet”)
Construction type:	permanent building
Foundation type:	irreversible foundation
Building type:	building (more than 2 units per building)
Equipment & facilities:	fully furnished; private bathroom, toilet, kitchen
Connection to neighboring buildings:	detached (free standing)
No. of buildings:	1
No. of residential units:	92
Storey count:	5
Area per person:	from 21 m² to 23 m² per unit
Integration of recreational and/or productive opportunities:	not specified; football court on the back side of building is not part of PUE
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
Solid waste management:	municipal
Implementation data	
Implemented?	Yes
Client:	“Mein Wien-Apartement” - Fonds für temporäres Wohnen in Wien (The city’s public fund for temporary housing, formerly “Zuwanderungsfond”)

Comments & references	
Additional comments:	on the ground level there are shops in the building (workshops, supermarket etc.)

50. VINZIRAST MITTENDRIN

Project website:

https://www.vinzirast.at/projekte/vinzirast-mittendrin/das-konzept-von-vinzirast-mittendrin/

Image 129: https://www.vinzirast.at/projekte/vinzirast-mittendrin/das-konzept-von-vinzirast-mittendrin/

Image 130: http://gaupenraub.net/vinzirastmittendrin

Project description:

Students and homeless people living together in shared flats with small kitchenettes; a bigger kitchen is shared per floor

Particularities of the Project:

on the ground floor there is a restaurant where residents can find employment

User specific aspects	
User groups:	students and homeless people living together
Drivers/triggers:	During the student protests in 2009 (“Uni brennt”), the Audimax of the University of Vienna was occupied. Homeless people joined them, spent the night there and actively participated in the occupation. After the end of the occupation, some students wanted to continue the exchange and togetherness. The idea was further developed with the St. Stephan’s Vincentian Community. Thanks to the help of the Haselsteiner Family Foundation, the house in Lackierergasse10/Währingerstraße 19, 1090 Vienna, could be acquired. With the support of many private donors, companies and countless volunteers, including many homeless people and current residents, the house was completely renovated. The extension and reconstruction is financed by a bank loan and a housing loan from the City of Vienna and will be repaid in the long term.

Social mix & cohesion:	students and homeless people living together
User experience:	Good, according to newspaper interviews and videos (Source: https://www.wien.gv.at/)
Location and environment	
Location:	Lackierergasse 10, 1090 Wien 48.2187 16.3576 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	residential area
Construction type:	Permanent construction
Foundation type:	Irreversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	3 private rooms share a kitchenette; several shared flats share a bigger kitchen and living room
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
No. of residential units:	10 shared flats with 3 bedrooms each
Storey count:	4 floors plus half developed attic
No. of persons per unit:	2-3 (Source: wien.gv.at)
Integration of recreational and/or productive opportunities:	productive garden beds on the roof top terrace; shared open space on roof top
Utilities	

Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	Connected to local grid
Solid waste management:	Municipal
Implementation data	
Implemented?	Yes
Year of construction:	Remodelled in 2013; building is older
Designer:	Gaupenraub
Client:	Verein Vinzenzgemeinschaft St. Stephan
Funding:	private funding and donations - via a loan by “Wohnbaukredit Wien”
Construction time:	3 years - since 2010, a concept for the cohabitation of homeless people and students was developed under the motto “living together” and implemented in 2012-2013 with the help of further donations and loans.
Plot ownership:	Private: Verein Vinzenzgemeinschaft St. Stephan
Life cycle aspects	
Innovation aspects:	students and homeless people living together
Comments & references	
Additional references:	https://www.wien.gv.at/video/embed/index.html?mid=1030

51. APARTMENTHAUS AUF DER SCHMELZ

Project website:

https://www.mein-wien-apartment.at/Apartment-in-Wien/Apartmenthaus-Schmelz

Image 131: https://www.mein-wien-apartment.at/Apartment-in-Wien/Apartmenthaus-Schmelz

Image 132: https://www.mein-wien-apartment.at/Apartment-in-Wien/Apartmenthaus-Schmelz

Project description:

Free-standing building at Schmelz that offers temporary housing to students: 74 apartments and 206 rooms hosting around 320 students in total (Source: derstandard.at)

User specific aspects	
User groups:	students only (Source: mein-wien-apartment.at)
Location and environment	
Location:	Auf der Schmelz 10, 1150 Wien 48.2030 16.3213 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	Green land, recreational area, built area

Construction type:	permanent construction
Foundation type:	Irreversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	some apartments have terraces Equipment: o Modern kitchenette with 2 hobs, extractor fan and refrigerator as well as storage space o Fully furnished and tiled bathroom with toilet and shower o A spacious room furnished for two people with bed or pull-out couch, bookshelf, and closet. o All rooms are equipped with high quality laminate. o free internet and cable TV available (Source: studium.at)
Connection to neighboring buildings:	detached (free standing)
No. of buildings:	1
No. of residential units:	74 apartments and 206 rooms for approx. 320 students in total (Source: derstandard.at)
Storey count:	4
No. of persons per unit:	1-2
Area per person:	rooms are 17 m² to 25 m²
Integration of recreational and/or productive opportunities:	The highlights in our student residence “Auf der Schmelz”: o communal kitchen o fitness room o sauna & steam bath o communal laundry room o 3 exercise rooms o 2 large soccer fields are offered for shared use by ASKö (sporting club) o ample bicycle parking (Source: studium.at)
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system

Electricity:	Connected to local grid
HVAC:	not specified; low-energy-home (Source: derstandard.at)
Solid waste management:	Municipal
Implementation data	
Implemented?	Yes
Year of construction:	2013 (Source: derstandard.at)
Designer:	Werkstatt Grinzing
Client:	MIGRA
Cost of construction:	11,9 million Euro total (Source: derstandard.at) Different source: 16,2 million Euro net (Source : wg-a.com)
Funding:	the city of Vienna is subsidizing the construction with 3.7 million Euro (Source: derstandard.at)
Construction time:	Start of planning: Oct. 2010; Start of construction: April 2012; Completion: Oct. 2013
Plot ownership:	MIRGRA leases from Federal real estate holding of Austria (BIG) (Source: derstandard.at)
Life cycle aspects	
Expected time of PUE on-site:	permanent
Comments & references	
Additional comments:	The average length of stay in Migra's student housing was only three years until 2008; since then, it has risen to five years - a fact that has been attributed at least in part to the economic crisis (Source: derstandard.at)
Additional references:	https://www.studium.at/studentenheime/migra-apartmenthaus-schmelz https://derstandard.at/1360161186965/Wohnen-und-Studieren-auf-der-Schmelz https://www.wg-a.com/projects/sportlerheim-auf-der-schmelz/

52. SECOND FUKUDA ELEMENTARY SCHOOL, KURASHIKI, JAPAN

Project website:

https://www.dezeen.com/2018/07/31/shigeru-ban-temporary-shelters-paper-japan-flooding-architecture/

Image 133: https://www.dezeen.com/2018/07/31/shigeru-ban-temporary-shelters-paper-japan-flooding-architecture/

Project description:

People affected by natural disaster are housed in the sports hall of an elementary school

Particularities of the Project:

frame structure of units made out of cardboard

User specific aspects	
User groups:	people affected by natural disaster
Drivers/triggers:	torrential rain
Location and environment	

Location:	3 Chome Otogi Tarumi Ward, K¯obe, Hy¯ogo Prefecture, Japan 34.6415 135.0667 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	school ground
Construction type:	not reversible building
Foundation type:	not specified; assumption: concrete
Weather resistance:	
Equipment & facilities:	not specified; beds made out or cardboard, mattresses
Connection to neighboring buildings:	detached (free standing)
Materials used:	cardboard, textiles
No. of buildings:	1 hall
Storey count:	1
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: connected to network
HVAC:	Assumption: connected to network
Solid waste management:	Assumption: connected to network
Implementation data	

Implemented?	Yes
Year of construction:	2018
Designer:	Shigeru Ban (Source: shigerubanarchitects.com)
Executing company:	Volunteers (VAN)
Funding:	not specified; Assumption: state founded
Construction time:	5 days after disaster The Hokkaido Ballistic Eastern Earthquake occurred on September 6, 2018, with an earthquake with a maximum seismic intensity of 7. The damage occurred mainly in the Hokkaido gall region. Volunteer Architect Network + Keio University SFC Bamboo Laboratory set up a simple separation system of paper core and fabric in evacuation centers from 9/15 to 9/24) (Source: shigerubanarchitects.com)
Plot ownership:	Assumption: public, school owned
Life cycle aspects	
Expected time of PUE on-site:	not specified; assumption: some days/weeks
Reversibility:	Totally reversible
Planned reuse/recycling:	Together with volunteers, Ban erected a modular system of partitions using recycled paper tubes, cardboard panels and fabric to create areas that can be curtained off for privacy. The materials can all be recycled again once they are no longer required (Source: dezeen.com)
Use of reused/recycled materials during construction:	Together with volunteers, Ban erected a modular system of partitions using recycled paper tubes, cardboard panels and fabric to create areas that can be curtained off for privacy. The materials can all be recycled again once they are no longer required (Source: dezeen.com)
Adaptability:	curtains can be arranged according to individual needs - families can have bigger compartments
Comments & references	
Additional references:	http://www.shigerubanarchitects.com/

53. ACCOMMODATION TENTS FOR EMERGENCY PERSONNEL – AUSTRIAN RED CROSS

Project website:

https://roder.com/produkte/unterkunftszelte-sas-tents/sas-tents-45485660.html

Image 134: Röder

Image 135: Shower container; Niederösterreichisches Rotes Kreuz

Location and environment	
Location:	Oberlaaer Straße 300-306, 1230 Wien 48.15119, 16.35756 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal setting
Climate:	Temperate
Sea level:	183 m
Physical properties	
Construction type:	prefabricated
Foundation type:	Tent pegs (if put on natural soil) or concrete blocks if put on concrete soil. In this case, the concrete blocks weight the tarpaulin of the tent down by their own weight.
Weather resistance:	The material of the tent skin is quite waterproof and resistant to rain. The material of the tent doesn't offer good insulation properties, thus it is of limited use in cold weather conditions.

	This can be alleviated by installing heater fans. However, this is not an eco-friendly long-term solution. In strong winds it is crucial to keep the tent well anchored and properly shut, otherwise there is a high risk that the wind will carry away the whole tent.
Equipment & facilities:	optional: Tarpaulin tent floor, partition walls, camp bed and blankets, fire extinguisher, beer benches Entrance is possible from both sides of the tent
Storey count:	1
No. of persons per unit:	usually, 10 persons per unit
Built area:	length of tent: 8m, width of tent: 5,64m = 45,12 m² (Source: roteskreuz.at (tents))
Area per person:	approx. 4,5 m²
Utilities	
Water supply:	The accommodation tents are not equipped with a water supply. It is usually part of the training exercise to provide the camp with water for cooking, cleaning and washing. A water supply system is usually established, providing hot and cold water for the kitchen tent, washing facilities and shower facilities.
Sanitation system:	The accommodation tent is not equipped with sanitation facilities. However, the accommodation tents are usually supplemented with mobile showering facilities and mobile toilets. Lower Austrian Red Cross usually employs a shower container (see Image 135), which is ready to use and can be transported via lorry trailer. There is one section for men and one for women. (Source: roteskreuz.at (sanitation containers)) Viennese Red Cross usually employs a shower tent, which has the same framework as an accommodation tent, but with built-in gender-separated shower modules. The segmentation is done with tarpaulin partition walls. The shower tent is equipped with a 1 m³ water tank and a heating module. Usually, chemical toilets are used as mobile toilet option.
Electricity:	Electricity is provided by diesel-powered emergency generators and usually limited to lights and a limited amount of power outlets. During daytime, the generator is usually not operating, also not during the night. Electricity is only made available during limited hours in the evening.

HVAC:	Heating is usually provided by heater fans (powered by diesel), but only if temperatures demand it. If the tents are used in summer times, often there is no heating possibility. For ventilation, the tent doors are opened in order to stimulate a draft. For the kitchen tent and shower tent a small water network is usually installed, including a diesel-powered mobile flow heater.
Implementation data	
Implemented?	Yes
Cost of construction:	One tent is erected by 4-8 persons (no special skills needed) in about 2-4 hours. No special equipment is necessary. It is also dismantled in few hours.
Plot ownership:	depends on the situation / application. For emergency trainings, those tents are usually erected on public grounds or military training areas
Life cycle aspects	
Expected time of PUE on-site:	Usually 1-13 nights
Expected total life time:	
Reversibility:	yes, tents can be removed completely. The tents are anchored by tent pegs or concrete blocks, which can easily be removed. If a tent floor is installed as well, the grass underground is usually compressed, but can recover in a limited amount of time.
Planned reuse/recycling:	After each use the tents are properly cleaned, dried and packed up to be stored in Austrian Red Cross warehouse, waiting for the next deployment.
Adaptability:	Tents can be merged by erecting them in a row. By this, larger rooms can be achieved (either as sleeping tents or as kitchen and dining tents, communal tents, command tents, etc.)
Comments & references	
Additional references:	https://www.roteskreuz.at/ (tents) https://www.roteskreuz.at/ (sanitation containers)

	Röder: Die SAS-Tents-Zelte - Verlässliche Outdoor-Spezialisten - https://roder.com/produkte/unterkunftszelte-sas-tents/sas-tents-45485660.html Österreichisches Rotes Kreuz - Niederösterreich: Unterkunft und Camp - https://www.roteskreuz.at/noe/katastrophenhilfe/unterkunft-und-camp/ Österreichisches Rotes Kreuz - Oberösterreich: Im Katastrophenfall ein Dach über dem Kopf - https://www.roteskreuz.at/ooe/dienststellen/steyr-stadt/was-wir-tun/katastrophenhilfsdienst-khd/unterkunft-und-camp/ Österreichisches Rotes Kreuz - Vorarlberg: Unterkunft & Camp - https://www.roteskreuz.at/vbg/dienststellen/rankweil/was-wir-tun/katastrophenhilfe/unterkunft-camp/ Österreichisches Rotes Kreuz - Niederösterreich: Mobile Sanitäranlagen - https://www.roteskreuz.at/noe/katastrophenhilfe/unterkunft-und-camp/mobile-sanitaeranlagen/

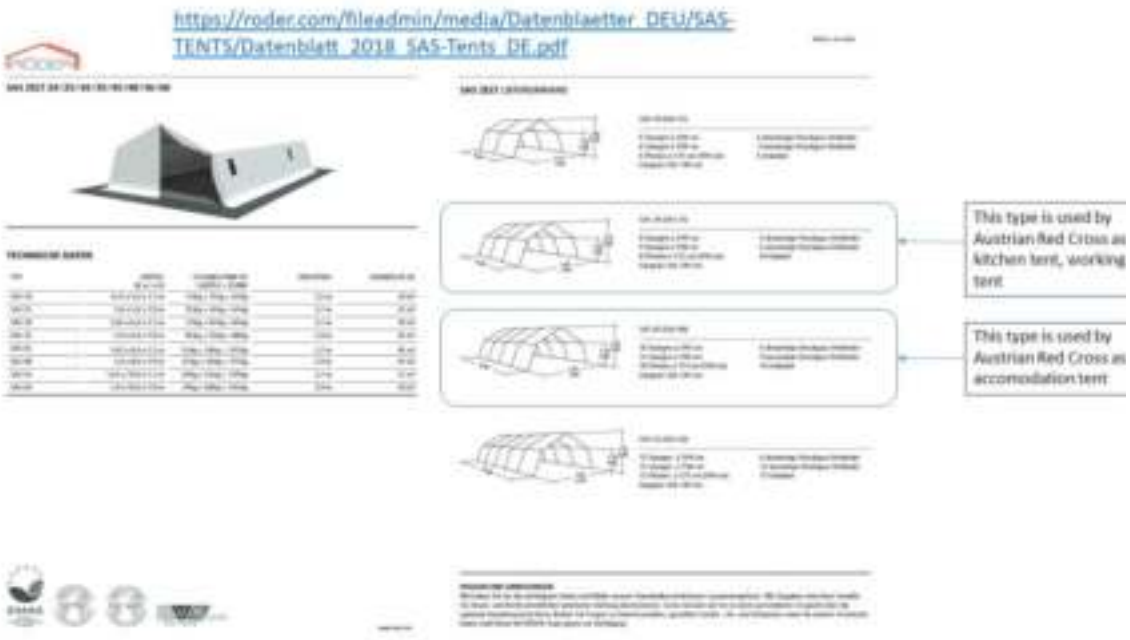


Image 136: Röder

54. CARPENTER'S SHELTER, ALEXANDRIA

Project website:

https://www.washingtonpost.com/news/inspired-life/wp/2018/07/06/americas-malls-are-emptying-so-this-vacant-macys-became-a-homeless-shelter/?noredirect=on&utm_term=.4b8e0cb05798 (newspaper article)

Image 137: Anna Mazarakis, Business Insider (https://www.businessinsider.de/macys-store-turned-homeless-shelter-phoos-2018-9?r=US&IR=T)

Project description:

homeless shelter moves into former retail store in shopping center for 18 months

User specific aspects	
User groups:	homeless people (families, single individuals) The average stay at Carpenter's Shelter is 2.2 months for individuals and 3 months for families (Source: carpentersshelter.org)
Drivers/triggers:	reconstruction of shelter
Location and environment	
Location:	5801 Duke St Alexandria, VA 22304 USA 38.8168 -77.1308 [Show on map]
Surrounding environment:	Urban environment

Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	commercial area (Source: alexandriava.gov)
Construction type:	on-site built
Foundation type:	Irreversible
Weather resistance:	Assumption: weather resistant
Equipment & facilities:	community space, David's space (Assumption: could be a worship room), playroom, small medical clinic run by volunteers. The temporary Carpenter's Shelter within the old Macy's does not have a full kitchen or a kitchen staff. Instead, the shelter has a warming station, pantry, and the help of volunteers year-round. Those volunteers help feed residents three meals every day of the year. "There's a regular parade of volunteers coming and going," Steene said. "They're bringing food in, they're serving it and cleaning up after themselves, and so that means a lot of extra traffic coming in and out in order to make Carpenter shelter work." The pantry also serves as a grocery store of sorts when residents are preparing to leave the shelter." (Source: buissnessinsider.de)
Connection to neighboring buildings:	detached (free standing)
No. of buildings:	1
No. of residential units:	not specified; "The Carpenter's Shelter has 60 beds to house residents at any given time. There are two hallways filled with rooms - one hallway has rooms to house 24 single men, and the other has rooms to house six families and 12 single women." (Source: businessinsider.de)
Storey count:	Assumption: 3
Utilities	
Water supply:	connected to centralised water supply system

Sanitation system:	connected to centralised wastewater system
Electricity:	not specified: assumption: mains connection
HVAC:	not specified: assumption: mains connection
Implementation data	
Implemented?	Yes
Year of construction:	Building: 1965 (Source: https://en.wikipedia.org/wiki/Landmark_Mall); Temporary housing: 2017
Designer:	Howard Hughes Corporation (Source: https://en.wikipedia.org/wiki/Howard_Hughes_Corporation)
Funding:	Donations etc.
Construction time:	“They had funding for 12 weeks of construction. Twelve weeks to gut the building of all that was Macy’s and then in its place build bedrooms, install bathrooms and furnish a recreation room and cafeteria. Twelve weeks to make the uninhabitable habitable.” (Source: washingtonpost.com)
Plot ownership:	private
Life cycle aspects	
Expected time of PUE on-site:	18 months
Expected total life time:	18 months
Reversibility:	reversible
Repurpose, reuse, new development of site/building:	Re-use of former department store building.
Comments & references	
Additional references:	https://carpentersshelter.org/program/residential-shelter/ https://www.alexandriava.gov/planning/ https://www.businessinsider.de/macys-store-turned-homeless-shelter-phoos-2018-9?op=1

	https://en.wikipedia.org/wiki/Landmark_Mall https://www.nytimes.com/2018/06/13/business/macys-homeless-shelter.html https://en.wikipedia.org/wiki/Howard_Hughes_Corporation

55. BUENA VISTA HORACE MANN K-8

Project website:

https://www.sfchronicle.com/politics/article/Homeless-shelter-in-school-a-costlyfailure-so-far-13653985.php (newspaper article)

Image 138: Michael Macor/The Chronicle (https://www.sfchronicle.com/politics/article/Homeless-shelter-in-school-a-costly-failure-so-far-13653985.php)

User specific aspects	
User groups:	homeless students of the school and their families
Drivers/triggers:	housing demand
#User experience:	not specified; few users showed up
Location and environment	
Location:	Buena Vista Horace Mann Community School, 3351 23rd St, San Francisco, CA 94110 37.7533, -122.4205 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Dry (desert / semi-arid)

Physical properties	
Site type:	P Public (Source: sfgov.org)
Construction type:	on site
Foundation type:	Irreversible
Equipment & facilities:	cots in a gym, bathroom and showers available
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Concrete etc.
No. of buildings:	1
Storey count:	1
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Implementation data	
Implemented?	Yes
Plot ownership:	not specified; Assumption: public
Life cycle aspects	
Repurpose, reuse, new development of site/building:	not specified; back to gym
Comments & references	
Additional references:	https://sfgov.org/sfplanningarchive/zoning-map https://www.sfchronicle.com/politics/article/Homeless-shelter-in-school-a-costly-failure-so-far-13653985.php

56. UNHCR FAMILY TENT AT ZAATARI CAMP

Project website:

https://www.nytimes.com/2014/07/05/world/middleeast/zaatari-refugee-camp-in-jordan-evolves-as-a-do-it-yourself-city.html (newspaper article)

Image 139: Adam Ferguson for The New York Times; https://www.nytimes.com/2014/07/05/world/middleeast/zaatari-refugee-camp-in-jordan-evolves-as-a-do-it-yourself-city.html

Image 140: N.Weaver/Refugee Studies Centre; https://www.theguardian.com/global-development-professionals-network/2015/jul/22/zaatari-refugee-camp-jordan-creativity-innovation

Project description:

“Since 2012, Za’ Atari has evolved from a small collection of tents into an urban settlement of some 80,000 persons. This is reflected in both the needs and aspirations of the camp’s residents and a transition to a more predictable, cost effective and participatory platform for the delivery of assistance. This includes a household level electricity distribution network with a solar power plant set to become operational by the end of the year. In Za’atari we provide two types of shelter: tents and caravans. Our plan is to eventually ‘caravanise’ the whole camp, so that every family has the security of living in a solid building that they can turn into their home. In Za’atari we are looking to ‘caravanise’ the camp because this is the shelter solution best suited to the people and the environment.” (Source: unhcr.org)

7,822 tents in camp; 24,000 caravans in camp; 4.6 – average family size; 461,000 – refugees have passed through the camp (Statistics up to date as of August 2017)

Particularities of the Project:

it became very huge; it contains a major street, dubbed “Champs-Elysees”; In the meantime, it has become Jordan’s 4th largest city.

As of March 2018, Zaatari shelters and other structures had been mapped. As at March 2018, Zaatari shelters and other structures had been mapped more than 25 times using satellite imagery by UNOSAT. Zaatari is one of the first camps to be mapped in detail by OpenStreetMap (Source: wikipedia.org)

User specific aspects	
User groups:	refugees of the Syrian Civil War
Drivers/triggers:	Syrian Civil War; active since 28th July 2012
Social mix & cohesion:	not specified; Syrian persons
Gender-sensitive aspects:	○ Economic empowerment through cash for work, paired with community engagement, life skills and protection services. - 170 women benefiting from cash for work, reaching 969 people – targeting those vulnerable to food insecurity. ○ 3 safe spaces: Oasis's for women and girls (one co-managed with the World Food Programme (WFP)) reaching 500 users per centre per month; providing life skills through literacy, Arabic classes, computer classes, and communication- tagged with day care facilities. ○ Protection referral services on issues from sexual and gender-based violence to legal status and disability; Awareness raising and engagement of men and boys in SGBV response and prevention. ○ Emergency medical support through financial assistance to support Oasis users. ○ Technical assistance on gender equality and women's empowerment to Za'atari and country-wide inter-agency humanitarian (Source: https://data2.unhcr.org/en/documents/download/39909)
Location and environment	
Surrounding environment:	Rural environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	not specified; rural area
Plot area:	Tents: The outside dimension of the tent is 4 m wide, 6.6 m long including vestibules and has a centre height of 2.2m. The tent, including assembled guy ropes, has a footprint of around 61 m². (Source: UNHCR design catalogue)

Construction type:	tents; additionally, caravans
Foundation type:	no foundation for the tents; caravans may have screed flooring
Weather resistance:	tents have less weather resistance than caravans (see video)
Equipment & facilities:	○ caravans are lockable, tents are not. ○ caravans: “There are over 24,000 prefabricated shelters, each include a latrine and kitchen to ensure privacy of the refugees.” (Source: UNHCR Fact sheet) ○ tent residents have to use communal kitchens that serve 40 families (Source: mercycorps.org.uk) ○ PUE has Mosques, Registration, Community Center, Community-Office, Youth Centres, Child and Family Centers, Distribution Points, Warehouse, Health Facilities, Playground, Recreation facilities, Recycling facilities, Schools, Kindergarten, Offices, Security offices, Water facilities By 2015, facilities were: ○ 2 supermarkets ○ kitchens ○ WASH blocks ○ mosques ○ 5 primary schools ○ 27 community centres ○ 7 playgrounds/sports courts ○ 2 small field hospitals ○ 2,500 refugee-operated businesses The basic facilities are spread evenly across the districts. Central facilities and informal businesses are mainly found lining the ring road and main axes (Source: Amsterdam publication)
Connection to neighboring buildings:	detached (free standing)
Materials used:	caravans: caravans are container-like boxes, some are stable (see Paper by Albadra), some are mobile and can be put on wheels and pushed around by manpower (see video on https://www.unhcr.org/7steps/en/shelter/) material: static caravans with screed flooring with the walls and roofs made of 40mm polyurethane insulated sandwich panel with inner and outer surfaces of 0.35mm steel sheet (Paper by Albadra)
No. of buildings:	more than 32.000 units and additional facilities

No. of residential units:	32.000 units (around 8000 tents and 24000 caravans)
Storey count:	1
Built area:	tents: 26.4 m²; caravans: not specified
Integration of recreational and/or productive opportunities:	see above; Open Space: As refugees settle into the camp, they convert many spaces into private open spaces, featuring fountains and courtyards paved with cement. One key type of public open space are the football fields and game areas. Volunteers from the Jordan women's national team, as well as donors from the United Kingdom and South Korea, have helped bring community-building football resources to the camp. The Netherlands-based Association of Municipalities' city plan for the future of Zaatari reportedly includes green space as a key addition to the current design (Source: Zaatari: The Instant City of Alison Ledwith)
Utilities	
Water supply:	Not connected to centralised water supply system. Drinking water: 3 wells produce 3.4 million litres water/day, which is distributed daily by lorries. (Source: Developing Zaatari)
Sanitation system:	Not connected to centralised wastewater system. Wastewater is transported by lorries to a newly built containerised treatment plant at Zaatari camp. (Source: Amsterdam publication) In a bid to improve efficiency, cost effectiveness, sustainability and the overall quality in service delivery, UNICEF established in 2016 three internal water wells with a combined daily capacity of 3,800 m³, and a wastewater treatment plant with a capacity of 3,600 m³/d; to meet the needs of the Camp's population. In addition, a piped water supply distribution system has been constructed and is being commissioned. This network will ensure piped water delivery to every household in the camp, together with a piped sewage network, linking the collection system to the wastewater treatment plant. In addition, solid waste management and community-led low-cost recycling are priorities. (Source: UNHCR Fact sheet)
Electricity:	Recently, all 12 districts have gained access to low-cost electricity, from 7 pm to 3 am. The intention is to increase the availability of solar energy. (Source: Developing Zaatari) "A 12.9-megawatt peak solar photovoltaic (PV) plant opened in November 2017 allowing UNHCR to increase the provision of electricity to refugees' homes from the current 8 hours up

	to 12 hours. This upgrade eased the living conditions of families in the camp and improved their safety and security, while facilitating the storage of food and allowing children longer hours to do their homework. The plant helped UNHCR save an average of approximately USD 5 million per year in electricity bills, an amount that could be redirected to expand other vital services to Zaatari camp residents. It is foreseen that other facilities such as hospitals, community centres and offices of humanitarian organisations working on site will also benefit from the electricity generated by the plant." (Source: UNHCR Fact sheet) "There are 370 electricians in the camp who control all the cables and provide electricity for shops, tents, and caravans" (Source: Kruijt thesis) It is not stated whether all housing units are connected to the grid.
HVAC:	not specified; "Cash for hygiene and cash for cooking gas is provided to the entire camp population regularly throughout the year and cash for heating gas is provided during winter." (Source: UNHCR fact sheet)
Solid waste management:	About 60 lorry loads (750 cubic metres) are transported to an external dumping site daily (Source: Developing Zaatari)
Implementation data	
Implemented?	Yes
Year of construction:	2012
Designer:	UNHCR
Executing company:	UNHCR
Cost of construction:	The tent has an approximate cost of 420 USD, excluding transport. (Source: UNHCR tent design)
Life cycle aspects	
Expected total life time:	not specified; expected life of tent unit: The tent can be expected to have a minimum 1-year lifespan, maintaining its sheltering and waterproofing capacities in all types of moderate climate. (Source: UNHCR tent design)
Adaptability:	wheels have to be added to the caravans in order to move them;

	caravans have been painted; according to a publication 92% of the surveyed households in caravans have been adapted (Source: McGrath et al., 2018) pictures show adapted (enlarged) tent structures; little gardens
Innovation aspects:	The following passages are taken from “Innovation at Zaatari: how do refugees make tents and caravans into homes?” by theguardian.com, 22/07/2015 The largest refugee camp in Jordan is on its way to becoming a permanent settlement. A new report shows how people fleeing Syria have brought creativity and innovation to their new homes. ‘Removal men’ have responded to demand by using fence posts and wheels to cart caravans around the camp (see Image 140) From their first arrival in Jordan, Syrian refugees have been challenging the way that the international community provides aid. When the Zaatari camp (population 83,000) was established in 2012, refugees, arriving by the thousands, were issued with tents. The tents were pitched on a selected plot by an international agency, and families would watch as the organisation erected them. Once it was completed, they would immediately recruit a young Syrian to take it down and move it to a location in the camp that was near to their family or friends, seeking to reconstruct the housing layouts from their community in Syria. In response, the agencies began to distribute the tents directly instead of pitching them for the new arrivals. ‘People will always find creative ways to use the resources available to them,’ said one international aid worker (see Image 141). Later on, the shelter programmes started supplying donated ‘caravans’. Like the tents, the refugees wanted them to be situated in proximity of their family needs. A demand was in turn created for services to move the caravans when they were first distributed, and later when refugees sold them on. To meet this demand, groups of Syrian welders took fence posts from the camp walls to use as large axles and attached wheels to them – creating a carting device to push the caravans around the camp. These ‘removal men’ had creatively responded to a demand to recreate, as best as possible, the social lives of the displaced Syrians. One humanitarian worker says it seems that now “organisations are trying to keep up with the refugees”. But this organic movement of the plots in the camp created some challenges – it is sometimes difficult for ambulances and other vehicles to travel through designated roads because homes have been placed there, and wastewater

	systems cannot be fully designed. “People will always find creative ways to use the resources available to them, to beat the system and to change the system to address their own priorities. It might be against our assumptions, but we have to embrace it, and acknowledge it,” another international aid worker said. Others in the camp show a strong sense of community in the ways they try to help each other. Refugees in Zaatari have used their creative skills to make homely and welcoming features in their caravans, such as making their own furniture. Much of it is made from the same wood panelling from the caravan floors and is readily and cheaply available in the local markets. Yet the owner of one of the largest carpentry businesses operating in the camp says that his ideas for his business initiatives and work here in Zatari come from a “...desire to be creative, and the needs here have forced me to be creative and not to dwell.” Syrian refugees have proved to be incredibly resilient and adaptive in face of the current political and economic pressures from the government and aid agencies. One refugee says: “People bring with them traditions and other circumstances and try to keep their traditions here in the camp.” For example, some display small birds outside their shops – a common pastime among Syrian people – and for many, having birds in the camp helps them to forget about the hardships they have experienced. “The Guardian” took these extracts from the report “Refugee Innovation: Humanitarian Innovation that Starts with Communities” by Alexander Betts, Louise Bloom and Nina Weaver at the Humanitarian Innovation Project (oxhip.org)
Comments & references	
Additional references:	https://www.unhcr.org/7steps/en/shelter/ https://de.wikipedia.org/wiki/Zaatari https://data2.unhcr.org/en/documents/download/39909 https://www.mercycorps.org.uk/photoessays/jordan-syria/life-refugee-spend-day-nour McGrath et al., 2018: Customisable Shelter Solutions – A Case Study from Zaatari Refugee Camp http://www.rsc.ox.ac.uk/refugee-innovation-humanitarian-innovation-that-starts-with-communities https://oxhip.org

	City of Amsterdam and VNG International, 2016: Developing Zaatari – Urban planning in a Syrian refugee camp, Jordan. https://issuu.com/blogwerk/docs/brochure_zaatari-print Alisone Ledwith, 2014: Zaatari: The Instant City. Affordable Housing Institute. Available at http://sigus.scripts.mit.edu/x/files/Zaatari/AHIPublication.pdf Further images: https://thenewcontext.org/inside-zaatari-camp-a-photo-essay/

Image 141: L.Bloom/Refugee Studies Centre; https://www.theguardian.com/global-development-professionals-network/2015/jul/22/zaatari-refugee-camp-jordan-creativity-innovation

Image 142: A.Betts/Refugee Studies Centre; https://www.theguardian.com/global-development-professionals-network/2015/jul/22/zaatari-refugee-camp-jordan-creativity-innovation

57. HOTEL FAVORITA

Project website:

https://www.obdach.wien/p/grundversorgung-obdach-favorita

Image 143: PictureObelix on https://commons.wikimedia.org/wiki/File:Laxenburgerstrasse8-DSC05421.JPG

Image 144: FSW, https://www.obdach.wien/p/grundversorgung-obdach-favorita

Project description:

Refugees living in a former workers' home that has been converted to a hotel.

User specific aspects	
User groups:	Asylum seekers (adults, single parents, families). Only people which have been assigned by Caritas are allowed to move in (Source: Obdach) "Early this year, the building has been assigned to a new function. It has been renovated by Obdach Wien, a subsidiary of the city of Vienna's social fund (FSW) and is set provide housing to homeless people and refugees." (Source: club.wien.at)
Drivers/triggers:	Necessity
Social mix & cohesion:	possibly yes: asylum seekers and homeless; users/clients of the bike kitchen
Gender-sensitive aspects:	"Additionally, there is a emergency housing project for women permanently available and a family room for the winter season" (Source: Obdach Wien)
Location and environment	

Location:	Grundversorgung Obdach Favorita, Laxenburger Straße 8-10 1100 Wien 48.1809, 16.3735 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Sea level:	ca. 200 m
Physical properties	
Site type:	Residential/Commercial area
Plot area:	1.794 m²
Construction type:	constructed on site only
Foundation type:	irreversible foundation
Building type:	building (more than 2 units per building)
Weather resistance:	Assumption: weather resistance is sufficient
Equipment & facilities:	The furnished units are equipped with bath, WC and fitted kitchen. A laundry room is open to all residents. The German class room is used for improving language skills. Also children's group for the youngest residents is part of the program. (Source: Obdach Wien)
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Assumption: bricks etc.
No. of buildings:	1
No. of residential units:	THE: 64 fully equipped units (Source: Obdach Wien) About the old hotel: The hotel disposes of 158 comfortable rooms in the categories Standard and Business. Furthermore, there are 3 apartments with comfortable furnishings at your disposal (Source: holidaycheck)
Storey count:	5 + attic + basement (Source: wien.gv.at)

	According to images on Google Maps, the back section seems to have 6 floors.
Built area:	1.388 m²
Integration of recreational and/or productive opportunities:	there is a big hall that has been used as gym and cinema in the past; current use not specified “In the ‘Bike Kitchen Favorita’ people with a refugee background are the experts: instructed by professional bike mechanics, they learn what to do what to do when their bike breaks down. Through accompanying language training and customer contact in the workshop, they also improve their German language skills. Here, everyone learns from everyone!” (Source: Obdach Wien; fws.at) Originally a self-help-project, Bike Kitchen Favorita has extended its offering.
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: Connected to local grid
HVAC:	Assumption: Connected to municipal network
Solid waste management:	Assumption: Connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	1901
Designer:	Hubert Johann Gessner
Client:	Arbeitersamariterbund
Executing company:	Assumption: SPÖ
Funding:	not specified; as part of public basic care, it is assumed to be state funded
Life cycle aspects	

Repurpose, reuse, new development of site/building:	used for hosting asylum seekers (planned use also for homeless people and families; not sure if it got realized)
Comments & references	
Additional references:	https://club.wien.at/magazin/bikekitchen-favorita/ https://www.holidaycheck.at/hi/hotel-favorita-geschlossen/b0351bca-c5db-34ad-b9d1-f3e528491b91 https://www.obdach.wien/n/bike-kitchen-favorita; https://www.fsw.at/n/neueperspektiven-wohnunglose-undgefluechtete-menschen-im-obdach-favorita https://www.derstandard.at https://www.geschichtewiki.wien.gv.at/ https://www.wien.gv.at/

Image 145: FSW, https://www.obdach.wien/p/grundversorgung-obdach-favorita

58. FLÜCHTLINGSUNTERKUNFT RENNBAHNSTRASSE

Project website:

https://www.berlin.de/ba-pankow/politik-und-verwaltung/beauftragte/integration/themen/artikel.275639.php

Image 146: https://www.berlin.de/ba-pankow/politik-und-verwaltung/beauftragte/integration/themen/artikel.275639.php

Project description:

Hotel is used to host refugees (apparently there was a time when it was as a hotel at the same time as well)

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	Necessity
Social mix & cohesion:	apparently used for asylum seekers and hotel guests at the same time until 1.1.2015 (Source: holidaycheck.com)
Location and environment	
Location:	Comfort Hotel Berlin Weißensee, Rennbahnstraße 87/88, 13086 Berlin, Germany 52.5622 13.4536 [Show on map]

Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	Mixed building area M2 (medium density) (Source: fbinter.stadt-berlin.de)
Construction type:	Assumption: concrete elements
Foundation type:	Assumption: irreversible
Building type:	building (more than 2 units per building)
Weather resistance:	
Equipment & facilities:	Many rooms are equipped with a pantry-kitchen and a shower room with WC. In the house there are several common rooms and children's rooms are available. Residents can use common kitchens. (Source: morgenpost.de)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Assumption: concrete
No. of buildings:	1
No. of residential units:	not specified; The dormitory is a former hotel. It has 250 beds with double and triple rooms and family apartments.
Storey count:	Assumption from pictures: 5
No. of persons per unit:	2-3
Integration of recreational and/or productive opportunities:	garden beds (Source: pankow-hilft.de)
Utilities	

Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: connected to local grid
Solid waste management:	Assumption: connected to centralized network
Implementation data	
Implemented?	Yes
Funding:	Not specified; assumption: state funded
Plot ownership:	“In February 2019, operations were taken over by state-owned operator LfG” (Source: berlin.de). Plot is assumed to be publicly owned.
Comments & references	
Additional references:	https://www.holidaycheck.at/hrd/comfort-hotel-weissensee-asylantenwohnheim/ba64566e-f6d7-3ee1-b6ee-246dd330a832 https://fbinter.stadt-berlin.de/fnp/legende/m2.html https://fbinter.stadtberlin.de/fnp/index.jsp?Szenario=fnpak https://www.pankow-hilft.de/rennbahnstrasse/ https://interaktiv.morgenpost.de/so-leben-fluechtlinge-in-berlin/ https://www.berlin.de/ba-pankow/politik-und-verwaltung/beauftragte/integration/themen/artikel.275639.php https://www.berliner-woche.de/weissensee/c-soziales/unterkunft-fuer-260-menschen-in-der-rennbahnstrasse-wird-vorbereitet_a56403 https://www.berlin.de/ba-pankow/politik-und-verwaltung/beauftragte/integration/themen/artikel.275639.php

59. SPORTHALLE TRESKOWALLEE, BERLIN

Project website:

https://interaktiv.morgenpost.de/so-leben-fluechtlinge-in-berlin/

Image 147: https://htw-berlin.tumblr.com/post/152373340853/angst-vor-fremden-kenne-ich-nicht

Image 148: Google Earth

Project description:

Emergency shelter for men, hosted in a gym.

User specific aspects	
User groups:	male asylum seekers
Drivers/triggers:	migration crisis
User experience:	Not satisfying (Source: morgenpost.de)
Location and environment	
Location:	Camous Treskowallee Treskowallee 8, Gebäude F, 10318 Berlin, Germany 52.4936 13.5253 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental

Physical properties	
Site type:	Public purpose area (“Gemeinbedarfsfläche)/Public purpose area with high share of green area; Higher education and research
Plot area:	approx. 3600 m²
Construction type:	Assumption: irreversible building made out of prefabricated concrete elements
Foundation type:	irreversible foundation
Building type:	building (more than 2 units per building)
Weather resistance:	
Equipment & facilities:	Assumption: use of showers and sanitation facilities of sports hall; dining facility: organised meals - maybe in cafeteria close-by (Source: berlin-hilft.de)
Connection to neighboring buildings:	detached (free standing)
Materials used:	not specified; Assumption: no structural changes in existing building
No. of buildings:	1
No. of residential units:	200 bunk beds units, no division
Storey count:	1
Built area:	1400 m² on google maps; according to source: hall is approx. 750 m²
Area per person:	
Integration of recreational and/or productive opportunities:	not specified; table tennis desk in hall
Utilities	
Water supply:	Assumption: connected to centralised water supply system

Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Connected to local grid; additionally: PV panels on the roof (see Image 148)
HVAC:	connected to network; it is unknown, how the hall is heated
Solid waste management:	connected to network
Implementation data	
Year of construction:	2015
Funding:	not specified; volunteer work; assumption: state funded
Construction time:	quick furnishing
Plot ownership:	not specified; owned/rented by university HTB
Life cycle aspects	
Expected time of PUE on-site:	Initially expected life span: some weeks; real life span: 11 months (Source: sozia.de)
Repurpose, reuse, new development of site/building:	back to sports hall
Comments & references	
Additional references:	https://interaktiv.morgenpost.de/so-leben-fluechtlinge-in-berlin/ http://berlin-hilft.com/2015/11/18/lichtenberg-notunterkunft-treskowallee/ http://www.sozdia.de/Arbeit-mit-Gefluechteten.1735.0.html http://sozdia.de/Wir-ueber-uns.1766.0.html sozdia.de/ (PDF) https://htw-berlin.tumblr.com/post/152373340853/angst-vor-fremden-kenne-ich-nicht

60. CONTAINERDORF KÖPENICK

Project website:

https://www.youtube.com/watch?v=UjRdU4-xaHg

Image 149: https://www.berliner-zeitung.de/berlin/neue-container-treptow-koepenick-widerspricht-senat-23624816

Project description:

Multi-unit building for fled persons made from containers

User specific aspects	
User groups:	400 refugees/asylum seekers
Drivers/triggers:	demand for housing for refugees
Location and environment	
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	Public purpose area (“Gemeinbedarfsfläche”)
Construction type:	Container building, prefabricated modules, light weight construction (see video)

Foundation type:	Not specified; “Suitable for many potential sites – there is just need for foundation, as well as power, water, and sewage connections” (Source: containex.at)
Building type:	building (more than 2 units per building)
Weather resistance:	It gets very got in summer times (Source: tagesspiegel.de)
Equipment & facilities:	shared sanitation and cooking facilities; outside: seating, garden beds; there is a gatekeeper and a 1,4 m high fence surrounding the environment (Source: bz-berlin.de)
Connection to neighboring buildings:	detached (free standing)
Materials used:	346 Containers
No. of buildings:	2
No. of residential units:	not specified; apparently for 400 persons
Storey count:	3
No. of persons per unit:	2 or 4 or more
Integration of recreational and/or productive opportunities:	a hairdresser is located inside the complex (because it was rather disturbing that people were cutting their hair in the sanitary facilities) (Source: tagesspiegel.de)
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	Assumption: Connected to local grid
HVAC:	Assumption: connected to network; District heating (Source: bz-berlin.de)
Solid waste management:	Assumption: connected to network
Implementation data	
Implemented?	Yes

Year of construction:	2014
Designer:	not specified; Assumption: city of Berlin
Client:	not specified; city of Berlin
Funding:	State/city funded
Construction time:	44 days
Plot ownership:	Assumption: public, due to zoning as public purpose area (“Gemeinbedarfsfläche”)
Life cycle aspects	
Planned reuse/recycling:	The social administration considers using such temporary homes that are no longer needed as infrastructure for homeless people during periods of cold weather. (Source: tagesspiegel.de [2])
Potential/planned secondary use concepts for TH-units:	The social administration considers using such temporary homes that are no longer needed as infrastructure for homeless people during periods of cold weather. (Source: tagesspiegel.de [2])
#Repurpose, reuse, new development of site/building:	The social administration considers using such temporary homes that are no longer needed as infrastructure for homeless people during periods of cold weather. (Source: tagesspiegel.de [2])
Comments & references	
Additional comments:	
Additional references:	https://www.youtube.com/watch?v=UjRdU4-xaHg https://www.youtube.com/watch?v=RWNpTlEKvSQ http://www.containex.at/de/referenzprojekte/ https://www.bz-berlin.de/berlin/marzahn-hellersdorf/der-erste-blick-ins-containerdorf-in-koepenick https://www.tagesspiegel.de/berlin/fluechtlingsunterkunft-ein-besuch-in-berlins-erstem-containerdorf/23799262.html https://www.tagesspiegel.de/berlin/obdachlosigkeit-in-berlin-bvg-schuetzt-nun-doch-obdachlose-vor-kaelte-zwei-bahnhoefe-werden-geoeffnet/23660310.html

61. STUDENTENDORF EBA51

Project website:

https://www.zeit.de/studium/uni-leben/2013-09/studentendorf-plaenterwald-wohnen-studieren (newspaper article)

Image 150: https://futurberlin.de/die-fragwuerdigste-wohnarchitektur-in-berlin-ein-vorschlag-fuer-den-plattformpreis-2014

Project description:

Participating parties: Jörg Duske, investor; Büro Holzer Kobler, architects;

Project details:

- Idea originates in the Netherlands
- project amounts to 400 student housing units
- Cafeteria, lawn for barbecues
- Units are 28 m² and rent for 220€/month
- partially equipped with balcony/terrace
- urban gardening structures are planned
- plot of 11.000 m² situated at Eichenbuschallee
- cost of construction: 13 mio EUR

User specific aspects	
User groups:	students
Drivers/triggers:	client saw that the same concept was working in Amsterdam on TV and wanted to build one in Berlin
User experience:	Very varied
Location and environment	
Location:	Eichbuschallee 51/53/55, Berlin, Germany

	52.4722, 13.4808 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Continental
Physical properties	
Site type:	Residential development area (“Wohnbaufläche”)
Construction type:	modular building
Foundation type:	Assumption: irreversible
Building type:	building (more than 2 units per building)
Equipment & facilities:	student living units have private bathroom and kitchen; some have a balcony “Additionally, there is the possibility to participate in urban gardening projects, use community kitchen, terraces, a volleyball court and swimming pool. As further place for getting together, the laundry room is conceived as a kind of pub” (Source: zeit.de)
Connection to neighboring buildings:	detached (free standing)
Materials used:	shipping containers; "About 2.50 meters wide, 2.90 high and 12 meters long, - at first a deep-sea container like this is sort of a long, dark tube. The two narrow ends are therefore completely replaced by glass walls. This is not sufficient, after all in such a metal box it would be unbearably hot in summer and freezing cold in winter. The walls are isolated, the floor is covered with mastic asphalt, heat-storing and sound-insulating at the same time. Also, containers are not placed directly on top of each other, so that vibrations are not transmitted. It is enough to know, that one is lying, so to speak, bed to bed with the resident of the neighbouring container." (Source: Zeit.de)
No. of buildings:	3
No. of residential units:	369
Storey count:	4

No. of persons per unit:	1
Area per person:	around 27 m²
Integration of recreational and/or productive opportunities:	Urban gardening
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	not specified; assumption: connected to network
HVAC:	not specified; assumption: connected to network
Solid waste management:	not specified; assumption: connected to network
Implementation data	
Implemented?	Yes
Year of construction:	2019
Designer:	Holzer Kobler Architekturen
Client:	HOWOGE
Cost of construction:	13,5 mln Euro
Funding:	private: Jörg Duske spent 13,5 mln Euro and sold it to HOWOGE upon completion
Plot ownership:	Private
Life cycle aspects	
Use of reused/recycled materials during construction:	Assumption: shipping containers
Comments & references	

Additional comments:	
Additional references:	https://ng-la.de/projekte/eba-51/ https://www.zeit.de/studium/uni-leben/2013-09/studentendorf-plaenterwald-wohnen-studieren/seite-2 https://www.howoge.de/wohnungsbau/neubauprojekte/eba-berlin-eichbuschallee.html https://holzerkobler.com/de/project/frankie-johnny https://futurberlin.de/steckbriefe-stadtentwicklung/steckbrief-studenten-containerdorf-am-plaenterwald http://harald-moritz.de/2016/gruen-vor-ort-zu-besuch-im-studierendendorf-eba-51/ http://www.planer-freiraum.de/Projekte-Objektplanung/Studentendorf-EBA51-Berlin/ (moved to https://ng-la.de/projekte/eba-51/)

Image 151: https://holzerkobler.com/de/project/frankie-johnny

62. RATHAUS WILMERSDORF

Project website:

https://interaktiv.morgenpost.de/so-leben-fluechtlinge-in-berlin/ (newspaper article)

Image 152: Olaf Selchow, https://www.bz-berlin.de/berlin/charlottenburg-wilmersdorf/fluechtlings-helfer-verwuesten-rathaus-wilmersdorf

Project description:

Temporary housing for 800 asylum seekers in old town hall in Berlin

User specific aspects	
User groups:	asylum seekers
Drivers/triggers:	demand for temporary housing in 2015 (starting from August 2015) (Source: tagesspiegel.de)
User experience:	not specified; media reported bad conditions (Source: morgenpost.de)
Location and environment	
Location:	Fehrbelliner Platz 4, 10707 Berlin, Germany 52.4898 13.3138 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal

Climate:	Continental
Physical properties	
Site type:	Mixed building area (“Gemischte Baufläche”)
Construction type:	irreversible building; made out of bricks
Foundation type:	irreversible foundation
Building type:	building (more than 2 units per building)
Equipment & facilities:	apparently the former cafeteria was used as dining facility; there are no showers in the small toilet installations, media reported that containers or shower tents (because containers did not fit through the gates) were installed in the courtyard; but that could not be verified through historical imagery on google earth
Connection to neighboring buildings:	duplex (one side linked to another house/building)
Materials used:	the pre-existing building was furnished; presumably, sanitation was provided in tents or containers in the inner courtyard
No. of buildings:	1
No. of residential units:	not specified; around 800 (and sometimes more) refugees lived in the building
Storey count:	5
No. of persons per unit:	2 or more
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Solid waste management:	not specified; Assumption: connected to network
Implementation data	
Implemented?	Yes

Year of construction:	2015
Designer:	Original building: Helmut Remmelmann in the 1940s
Client:	Arbeiter-Samariter-Bund was managing the PUE
Funding:	Public
Construction time:	Furnishing went very quick (Source: tagesspiegel.de)
Plot ownership:	public building
Life cycle aspects	
Expected time of PUE on-site:	not specified; effectively it was used until December 2017, so over 2 years
Expected total life time:	Was closed in 2017
Comments & references	
Additional comments:	
Additional references:	https://interaktiv.morgenpost.de/so-leben-fluechtlinge-in-berlin/ https://www.tagesspiegel.de/berlin/bezirke/charlottenburg-wilmersdorf/neue-notunterkunft-in-berlin-wilmersdorf-rathaus-der-fluechtlinge/12190900.html https://www.tagesspiegel.de/berlin/fluechtlinge-in-berlin-notunterkunft-im-rathaus-wilmersdorf-schliesst-bald/20424620.html https://www.tagesspiegel.de/berlin/bezirke/charlottenburg-wilmersdorf/neue-notunterkunft-in-berlin-wilmersdorf-rathaus-der-fluechtlinge/12190900.html https://www.morgenpost.de/bezirke/im-westen-berlins/article213813401/Behoerden-pruefen-Rundbau-des-Rathauses-fuer-Fluechtlinge.html https://de.wikipedia.org/wiki/Rathaus_Wilmersdorf https://www.morgenpost.de/ [3]

63. PLACE / LADYWELL

Project website:

https://www.rsh-p.com/projects/place-ladywell/

Image 153: https://www.rsh-p.com/projects/place-ladywell/

Image 154: https://www.rsh-p.com/projects/place-ladywell/

Project description:

“Rogers Stirk Harbour + Partners’ partnership with Lewisham Council to create a deployable residential development using a volumetric construction method on the site of the former Ladywell Leisure Centre, which was demolished in 2014 and left vacant pending redevelopment, responds to the high demand for housing in the Borough by offering a short-term solution. The temporary housing development has a maximum procurement budget of £4,980,000 and will remain on site for between 1-4 years, providing 24 homes for local people in housing need as well as four ground-floor community/retail units. All units exceed the current space standard requirements by 10%, helping the Council to meet an existing shortfall in high quality temporary and two-bed accommodation whilst it develops new build and estate regeneration programmes for the Ladywell site and others. The volumetric technology provides high quality, energy efficient accommodation and means that the development can be built faster and cheaper than if traditional methods were used. The finished structure is also fully demountable meaning it could be used over a number of years and in different locations across the borough.” (Source: https://www.rsh-p.com/projects/place-ladywell/)

User specific aspects	
User groups:	local people in housing need
Drivers/triggers:	need for affordable housing
Social mix & cohesion:	residential and commercial/community units
Location and environment	
Location:	261 Lewisham High St, Lewisham, London SE13 6AY, UK 51.4565, -0.0138 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	not specified; site available for 4 years; site of the former Ladywell Leisure Centre, which was demolished in 2014 and left vacant pending redevelopment EDIT 30.11.2020 - site type: “town center”
Plot area:	Approx. 2.900 m² (measured on Google Earth)
Construction type:	modular; PLACE/Ladywell takes advantage of volumetric, factory manufactured construction techniques to build high quality housing for Lewisham Council to a short programme and for reduced costs. The units are manufactured from standard timber components using simple technologies and then fully fitted out with bathroom, kitchen, flooring and all finishes in the factory. This gives the manufacturer full control over quality, finish and programme as well as reducing construction time, waste and noise on site. The 24 two bedroom apartments and four community/retail units were constructed in a factory as 64 fully fitted out units, before being transported by road to site and lifted into place. Balconies and lift/stair cores are also manufactured and installed on site as separate components. Each unit takes approximately one month to be completed in the factory, and the team were able to install a full floor (16 units) in a single week. From preparatory ground works to practical completion

	the construction programme was nine months. This off-site manufacture approach provides further advantages. The programme is significantly reduced resulting in lower construction costs, a key factor in the viability of the project for the council. Waste is minimised, and in addition to the use of timber as the primary construction material, the building is far more sustainable than a traditional building. It allows for greater client flexibility, creating spacious and affordable homes for its residents whilst addressing important social issues.
Building type:	building (more than 2 units per building)
Equipment & facilities:	fully furnished; elevators
Connection to neighboring buildings:	detached (free standing)
Materials used:	primary material: timber
No. of buildings:	1
No. of residential units:	24
Storey count:	4
No. of persons per unit:	4
Built area:	not specified; approx. 1.000 m² measured on Google Earth Total Residential GIA: 2.050 m² Total Commercial GIA: 940 m² Total GIA: 2.990 m²
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	not specified; The flats have excellent energy efficiency through a fabric-first approach, which does not rely on renewable energy technology or a gas connection. The prefabricated timber elements allow construction to excellent levels of precision and provide a simple, thermally efficient and airtight envelope once constructed. Annual energy demand for heating and cooling – excluding any contributions from on-site renewables – for the flats are 21.91kWh/m², whilst annual energy demand

	for regulated electrical usage for flats is 7.14 or 17.37 kWh/m². SAP calculations show an EPC Rating of B and 12% improvement of block Dwelling Emission Rate over 2013 Building regulations Target Emission Rate are achieved. A code for sustainable homes pre-assessment indicated Level 4 is achievable with a score of 69.6%. (Source: http://www.constructionleadershipcouncil.co.uk/ (PDF))
Solid waste management:	not specified; connected to local network; CIRCULAR DESIGN: The land for this project had limited availability of three or four years, therefore it was essential that the units can be easily dissembled while providing attractive, comfortable housing in the meantime. It was also important to minimise waste – and this method of manufacturing produced 0% waste, considerably more efficient than a traditional build which typically produces 15%. The design for demounting, moving and reassembling ensures the scheme can be redeployed with minimal associated waste. The only areas of waste are the cladding design to suit the aesthetic of the redeployed location. (Source: http://www.constructionleadershipcouncil.co.uk/ (PDF))
Implementation data	
Implemented?	Yes
Year of construction:	2014-2016
Designer:	Rogers Stirk Harbour + Partners
Client:	Lewisham Council (Source: https://www.rsh-p.com)
Executing company:	SIG
Cost of construction:	4,980,000 GBP (Source: https://www.rsh-p.com)
Funding:	Not specified; assumption: public
Construction time:	Each unit takes approximately one month to be completed in the factory, and the team were able to install a full floor (16 units) in a single week. From preparatory ground works to practical completion the construction programme was nine months. (Source: https://www.rsh-p.com)
Life cycle aspects	
Expected time of PUE on-site:	4 years

Expected total life time:	Planning permission for PLACE/Ladywell is until 2020 whilst a wider master plan for the area is agreed and implemented. After this time, the scheme can be redeployed on other Council sites up to five times and with a design life of up to 60 years. (Source: https://www.rsh-p.com)
Repurpose, reuse, new development of site/building:	This modern construction method and tenure blind approach to the design allows for the simple reconfiguration of the building elsewhere. Planning permission has been granted till 2020, following this PLACE/Ladywell will be redeployed elsewhere. This a permanent housing solution in a temporary location. (Source: https://www.rsh-p.com)
Innovation aspects:	not specified; “There were three key objectives. Firstly, to provide 24 homes for homeless families living in poor quality temporary accommodation. Secondly, to create community commercial at the ground floor. Thirdly, to infill a prominent site on the high street which had been left empty following the demolition of the Ladywell Leisure Centre and act as a catalyst for future regeneration.” (Source: https://www.rsh-p.com)
Comments & references	
Additional comments:	“WELLBEING DESIGN: The health and well-being of occupants is a fundamental consideration of the development. For example, internal noise was considered with measures such as high specification triple glazing and high levels of sound insulation between dwellings, which exceed acoustic regulations by 60%. Mechanical Ventilation with Heat Recover was also installed, providing best practice ventilation rates. The design of the development maximises daylight and sunlight levels within each of the units, allowing good light levels to be achieved when the units are re-configured elsewhere. Thanks to great local transport links and ease of accessibility, the development can be car free. External lighting in the development is limited to low energy security lights, which won’t cause light pollution. What’s more, the construction process is highly condensed compared to traditional builds, which helps to reduce the impact of noise and air quality on the neighbourhood and local people during the construction stage.” (Source: http://www.constructionleadershipcouncil.co.uk/ (PDF))
Additional references:	https://www.rsh-p.com/projects/place-ladywell/ http://www.constructionleadershipcouncil.co.uk/ (PDF)

64. Y-CUBE

Project website:

https://www.rsh-p.com/projects/ycube/

Image 155: https://www.rsh-p.com/projects/ycube/

Project description:

Y:Cube fulfils a brief from YMCA London South West for a portable ‘plug and play’ housing system offering good quality affordable accommodation in self-contained units. The concept is not designed to provide long term accommodation, but to act as a transition between temporary accommodation and market housing. The properties will be let by YMCA on assured short-hold tenancies at 65% of the market rent for a one bed flat in the area with an anticipated length of stay of 3 to 5 years. Y:Cube Housing is a modular system using volumetric technology that enables the factory-made units to stack easily on top and/or alongside each other, making it completely adaptable to the size and space available and therefore perfect for tight urban sites, creating semi-permanent communities.

User specific aspects	
User groups:	starter accommodation for young people unable to either gain a first step on the housing ladder or pay the high costs of private rent In Southwest London, the YMCA plans to build 36 of the units as a prototype. Young people who have been living at the YMCA’s hostel, going through a two-year education and employment program, will have the chance to rent one of the apartments below the market rent. (Source: fastcompany.com)

Drivers/triggers:	demand for affordable housing units for local residents
Location and environment	
Location:	148a Clay Ave, Mitcham CR4 1FU, UK 51.4090 -0.1476 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	formal
Climate:	Temperate
Physical properties	
Site type:	not specified; Assumption from Google Earth: unbuilt building land Edit 30.11.2020: maybe residential (Source: merton.gov.uk (PDF)) or sand (https://www.merton.gov.uk/ (PDF 2), p. 52)
Plot area:	1.100 m² (measured on Google Earth)
Construction type:	modular construction
Foundation type:	not specified; in the Youtube video, it looks like a reversible foundation made out of concrete blocks
Building type:	building (more than 2 units per building)
Weather resistance:	weather resistant
Equipment & facilities:	The Mitcham scheme consists of 36 self-contained one bed flats and a single unit community office. Each identical flat has a net area of 26 m² containing a fully furnished living space with galley kitchen, separate bedroom and en-suite toilet and shower. The units have 2.5m ceiling heights and full height glazing. The use of large windows allows a generous amount of natural light into the units and the walkways also act as balconies on upper levels. The combination of natural and bright colours creates a lively atmosphere within the internal courtyard, and a mixture of hard and soft landscaping creates external social areas encouraging community interaction.
Connection to neighboring	detached (free standing)

buildings:	
Materials used:	timber modules
No. of buildings:	3
No. of residential units:	36
Storey count:	3
No. of persons per unit:	1
Built area:	not specified; GFA 1,640 m²
Area per person:	26 m²
Utilities	
Water supply:	Assumption: connected to centralised water supply system
Sanitation system:	Assumption: connected to centralised wastewater system
Electricity:	not specified; Further green technology enhancements to reduce further the carbon impact of the scheme will include solar photovoltaics and solar water heating panels ”Lightweight timber panels with superior levels of insulation are used to create an air and water tight structure. Pre-glazing and cladding are also are also part of the factory process, which helps achieve high thermal and acoustic performances which exceed Code Level 4 for Sustainable Homes. The accommodation is so well insulated that it is estimated heating bills for residents will be reduced by up to 80% per annum.” (Source: https://ymcastpaulsgroup.org/)
Solid waste management:	not specified; assumption: connected to municipal network
Implementation data	
Implemented?	Yes
Year of construction:	2013-2015
Designer:	Rogers Stirk Harbour + Partners
Client:	YMCA London South West

Executing company:	Services Engineer: PBA Landscape Architect: Landform Manufacturer: Insulshell
Cost of construction:	1,600,000 GBP
Construction time:	“Each completed unit is then delivered to site on the back of a lorry and lifted into place using cranes before being made ready for use through connection to mains water, gas and electricity. It is a quick and efficient method of construction that requires no scaffolding or water on site, making it a quiet and neighbourly process. The total construction period on site in Mitcham was five months and the scheme has a design life of sixty years. It is also fully deployable system allowing for future relocation onto other sites. Each unit is constructed from high quality, eco-efficient materials (primarily renewable timber) and can achieve Code Six for Sustainable Homes. The factory conditions in which the pods are assembled ensure tolerances of 2mm, creating accommodation that is so well insulated that they require little or no heating, even in winter months. This presents further valuable savings as the cost of energy rises.”
Life cycle aspects	
Expected time of PUE on-site:	5 years (“In Southwest London, the YMCA plans to build 36 of the units as a prototype. Young people who have been living at the YMCA’s hostel, going through a two-year education and employment program, will have the chance to rent one of the apartments below the market rent. The YMCA has leased the land for five years, and if it needs to move at the end of the lease, the homes can come along: Each can be picked up by a crane, just as it was installed, and easily carted off to another location (though that may be a little jarring to residents).) (Source: Fastcompany)
Expected total life time:	“The total construction period on site in Mitcham was five months and the scheme has a design life of sixty years. It is also fully deployable system allowing for future relocation onto other sites.” (Source: https://www.rsh-p.com/projects/ycube/)
Adaptability:	additional units can be added
Comments & references	
Additional references:	https://www.fastcompany.com/3026691/tiny-prefab-50000-homes-could-make-outrageously-expensive-cities-affordable

	https://www.merton.gov.uk/ (PDF) https://www.merton.gov.uk/ (PDF 2) https://www.youtube.com/watch?v=cTpPIywVfrk https://ymcastpaulsgroup.org/ycube-mitcham/ https://www.designingbuildings.co.uk/wiki/Y:Cube https://www.theguardian.com/artanddesign/architecture-design-blog/2015/sep/08/inside-richard-rogers-ycube-homes-for-homeless-people http://176.32.230.44/wpcourses739.co/ycube-mitcham/ http://architecturemps.com/wp-content/uploads/2016/08/Architecture-MPS-5-Housed-by-Choice.pdf, p.108ff.

65. TEEPEELAND BERLIN

Project website:

https://teepeeland.wordpress.com/

Image 156: Julia Zeilinger

Project description:

“Teepeeland is an open non-commercial and democratic neighbourhood, residential and cultural project. Here live people, beyond social constraints of different generations and nations in a community together. They raise central questions about the coexistence of people in the big city. The inhabitants of Teepeeland go after very different occupations and activities. Internally, there is a sturdy structure. Thus, all decisions are made in a grass-roots democratically weekly plenum. Everyone who would like to have a warm welcome to Teepeeland. The inhabitants of Teepeeland want to live in harmony with nature. The economical use of resources and the orientation towards sustainability are two important principles. So (as far as possible) nothing is bought, but already existing processed further. It is not used in permanent houses but exclusively in tipis or yurts, that is in transportable dwellings. For the construction the tipis or yurts are used exclusively materials that are found unused in public space. Material that has already fulfilled a purpose once, gets here a second life. Teepeeland is well connected with the local neighbourhood and initiatives, it is involved in local decision-making processes, such as the design of the shore area [of river Spree]. It participates in international cultural events. Teepeeland also has its own cultural events, such as cinema or comedy evenings. The jam session that takes place every Saturday has already become a real insider tip. Here meet professional musicians and amateur or street musicians together.” (Source: https://teepeeland.wordpress.com/)

Particularities of the Project:

Teepeeland is an informal settlement, consisting mostly of tents and yurts in Berlin, right next to river Spree. Teepeeland is located on public ground, a public footpath (starting from Schillingbrücke) is leading directly through Teepeeland and has to be accessible for non-residents all the time. (This is a precondition for the local government in order to tolerate Teepeeland.) Therefore, Teepeeland has to be in contact with neighbours and walkers on a regular basis. Teepeeland wants to demonstrate an alternative sustainable lifestyle and is a multi-cultural community. Decisions are based on weekly plenary sittings in a bottom up way (grassroots democracy).

User specific aspects	
User groups:	All kinds of persons are living in Teepeeland, mostly artists, persons who opt out, ”tramps”, etc. In recent years, it was also temporary home to refugees and asylum seekers. Some residents only live in Teepeeland seasonally [4] According to the homepage [1], Teepeeland was also available on couchsurfing, offering accommodation for up to 14 days for tourists. Extensions seemed to be possible, e.g. for persons who moved to Berlin and had yet to find permanent formal accommodation. This service now seems to be closed down [6] Remark on couchsurfing website: ”Nimmt keine Gäste auf”. However, there seems to be space and accommodation to guests as well, persons who are interested in joining Teepeeland as residents are invited for test living to see if the newcomers fit into the group, are willing to participate, etc. The impression is that guests and potential newcomers live in commercial tents (Igluzelte) before investing time and effort into building their own tipis [4]
Drivers/triggers:	The founder of Teepeeland, nicknamed “Flieger”, was already involved in founding Cuvrybrache, but once it got more chaotic and drug problems of residents became more prevalent, he abandoned Cuvrybrache and looked for another location to express his preferred informal, self-determined lifestyle. He identified the location of Teepeeland, which is (same as Cuvrybrache) located directly at river Spree. It is about 1,75 km away from former Cuvrybrache.
Social mix & cohesion:	In beginning of May 2019, there were 10 permanent residents of Teepeeland , one of which is female. [4] The residents come from different countries and cultural backgrounds, thus leading to a mix of different languages and sometimes to misunderstandings / miscommunications about

	who things should be run and organized and who should feel responsible for which task. It seems to be expected from residents to also provide their time and manpower for communal construction projects (e.g. improving the communal stage, ...)
Gender-sensitive aspects:	Only one of the 10 permanent residents is female. There is no gender-segregated toilet (pit latrine).
User experience:	One resident, who has just been accepted as a permanent resident in late 2018, seemed to be very proud of now formally being part of Teepeeland. He appreciates the freedom and the alternative lifestyle. He is registered at a friends' address, thus he receives some social benefits from the state. However, there also was some criticism about the weekly plenums. He hinted at hidden hierarchies and backdoor agreements (of the founder with residents who are part of Teepeeland for the longest period of time) before discussing it in those grassroots democratically weekly plenums. [4] Another resident has been part of Teepeeland for some years. For him it felt intrusive that I was trying to engage in conversations with residents, however, after explaining my intention, he opened up a bit and also gave me his insights into Teepeeland living. He appreciates the location of his specific tipi, as it is located very close to an access point to Spree and his tipi being a bit away from the central community space. He appreciates being left alone and is not very happy with lots of alcohol and alleged other drugs being consumed on the premise. Over the years, he has gathered quite an impressive collection of (waste) items that he found moving around in Berlin and is decorating his tipi with those found and scavenged items to make it more cosy and personalised.
Location and environment	
Location:	Köpenicker Straße 43, 12435 Berlin (riverbank of Spree river) 52.5100 13.4263 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	informal setting. Teepeeland is located on public land, there is no formal tenure agreement, however, the residents are in contact with the district council and are tolerated if some rules are obliged (e.g. all time access to public footpath). However, Teepeeland can be evicted on short notice. [4]

	Teepeeland does not offer a formal address, thus residents cannot use it as ”primary residence” for administrative applications. Thus, residents living there permanently cannot apply for social benefits due to a missing “primary residence”. Some of the residents register their “primary residence” at friends or family members at permanent, formal addresses in order to benefit from the German social security system. [4]
Climate:	Temperate
Sea level:	36 m
Physical properties	
Site type:	Green field (“Grünfläche” according to Berlin’s zoning plan) [5] Formerly, this area was part of the “Death strip” of divided Berlin, separating East and West Berlin. A part of the wall is still present.
Plot area:	approx. 1950 m² (approximation via Google Earth)
Construction type:	DIY, improvised, “mix and match” of found materials and items and tools, no heavy machinery used.
Foundation type:	reversible foundations, tents pegs
Building type:	mainly Tent / tipi
Weather resistance:	With the accommodations being DIY tipis, yurts and huts, the weather resistance is limited, e.g. regarding cold weather and depending on the handicraft skills of the resident(s) maybe also regarding rain. Wind resistance might also be limited due to manually mounted pegs and anchoring. [4]
Equipment & facilities:	shared kitchen in communal kitchen hut (cooking together is part of Teepee Land living). Shared community area, shaded by trees with sofas, tables, etc. Shared latrine, improvised washing facilities. Allegedly, also cats and chicken / doves are part of Teepeeland. During the field visit I only met a cat. [4] Due to those animals, dogs are not allowed in Teepeeland. Internet is available via neighbouring association “Spreeacker”. There is also a boat at Tepeeland, however, it is unclear if it is in use and seaworthy. [4]
Connection to neighboring buildings:	detached (free standing)

Materials used:	all types of scavenged, reused materials that can be found in Berlin. For tipi-construction mainly tarpaulin and wooden poles, pallets
No. of buildings:	12 Tipis, 2 tents, 2 huts, 1 container, 1 communal hut (kitchen) and stage (for yam sessions, plays, events)
No. of residential units:	16 or 17, in May 2019: 10 permanent residents (9 male, 1 female), varying number of guests
Storey count:	mostly 1 (some tipis are built in a way that they have a “ground floor” for sleeping and a “second level” right under the top of the Tipi to relax. However, the height of this “room” is not sufficient to stand upright. Rather, you can sit or lie down to relax. Nouri’s tent was built in this way. [4]
No. of persons per unit:	1-2
Built area:	approx. 18 m² per tipi (approximation via Google Earth), in total approx. 330 m² of built area
Area per person:	approx. 18 m²
Integration of recreational and/or productive opportunities:	Free box (where you can put items you no longer need and others can come pick it up for free), table football dovecot (or chicken stable), flower and vegetable pots and green areas. Access to river Spree. Communal stage for cinema, jamming, music, stand-up comedy and other events. Community bar for hosting events.
Utilities	
Water supply:	There is no central water line. Water has to be collected from neighbouring building complex and Verein “Spreeacker”. Residents use their own water collection containers (up to 20L) [4] There is no showering / washing facility available, therefore residents improvise their own shower facilities close to the bank of river Spree (see Image 157). There is no drainage system in place (however, with the limited water volume per shower, flooding does not seem to be a problem). [4]
Sanitation system:	There is one elevated pit latrine in Teepeeland (see Image 163). It is a self-made urine diversion dry toilet. The feces collected in a container is mixed with organic waste and composted. There is no light available in the latrine. There is no handwashing facility available close to the Nouri is trying to improve the sanitation system (e.g., repairing the weathered latrine shed), as it could be more convenient to

	use for residents and guests. Also, the composting process would need improvement for good hygienisation [4].
Electricity:	There is an arrangement with neighbouring Spreefeld / Spreeacker Genossenschaft regarding electric energy and internet. The Teepeeland residents have to pay for the electricity they use. [4]
HVAC:	Residents are seemingly also willing to or have to endure (due to financial constraints) low temperatures in their tipis during wintertime. [4]
Solid waste management:	There is a compost pit used for feces and organic waste (observation: mostly branches, structural material, wood shavings). Being close to Spreefeld / Spreeacker Genossenschaft, the waste is most likely subjoined with the local waste collection system. However, the residents of Teepeeland actively try to avoid waste and even counteract Berlin's "disposable culture", by scavenging items, materials and whatever else seems useful to them from Berlin's streets. With having some ideas in mind of what to build with leftover materials (e.g. wood, wire, metal, ...) later on, there are accumulations of scrap close to almost every tipi, waiting for being used in an upcycling project. [4]
Implementation data	
Implemented?	Yes
Year of construction:	2012 and subsequent expansions [1]
Designer:	no architect, mostly informal setting. Residents build their tipis on their own with found and scavenged materials.
Executing company:	no company involvement, built by residents themselves
Cost of construction:	varying. Low or no cost due to reused scrap material.
Funding:	informal. low costs due to reused scrap material.
Construction time:	n/a. New residents are in charge of building their own tipis and gathering their materials for construction.
Plot ownership:	Teepeeland is located on public ground (river Spree embankement), which is administered by district office.
Life cycle aspects	

Expected time of PUE on-site:	unclear. The district office responsible can revoke their acceptance (Duldung) of Teepeeland. If need be, Teepeeland can be evicted with short notice. However, for the moment Teepeeland is tolerated.
Expected total life time:	unclear (see above)
Reversibility:	With tipis being the main type of accommodation, it seems reasonable to assume, that Teepeeland is quite reversible.
Planned reuse/recycling:	This might be up the the residents themselves. If they choose to leave or have to leave, they might take parts, materials of their yurts and huts with them, if they continue living in informal, self-determined circumstances. Having waste avoidance in their philosophy of Teepeeland, they might be willing to reuse as much as possible.
Potential/planned secondary use concepts for TH-units:	The improvised, DIY style of the pop-up units allows also to reuse parts of them.
Use of reused/recycled materials during construction:	Almost all materials used for constructing the tipis and huts are from scraps, waste materials and other items found in the city.
Adaptability:	Teepeeland is constantly adapted to the needs of the residents. In their DIY-homes they improve and modify according to the materials they can find in the city. With new residents joining and old residents leaving there is also change in the arrangement of the tipis. For late May 2019, it was planned to move the communal stage away from the property line, since there were planned construction works at Eisfabrik. „Nothing is completed. It will always keep changing – but that's the essence of this project. (statement as in [7])
Repurpose, reuse, new development of site/building:	Once Berlin was no longer divided, the areas of the former "death strip" were dormant. At the location of Teepeeland there is still a piece of Berlin wall that is under protection for historic preservation, which prevented this area to be developed into building area. Therefore, it was an opportunity for the founder of Teepeeland to appropriate this empty land. However, being right next to river Spree, the river bank is also used for a public pathway, which now directly runs through Teepeeland. Adjacent to Teepeeland, there is a derelict ice factory ("Alte Eisfabrik"), which is in danger of collapsing. Owners of the plot and of Eisfabrik were always very keen to not let Teepeeland incorporate the vacant factory building or Teepeeland spilling over to their property, partly due to liabiliy issues (in case of collapse or injuries due to falling bricks). Therefore, the neighbourly terms between Eisfabrik and

	Teepeeland were not free of frictions. With potential new plans to demolish the old factory building and building something new, the disputes concerning the expansion of Teepeeland might continue. All the trees and bushes on site have been growing for the last 30 years (since the end of Berlin wall), also soil has been accumulated. However, the old paving blocks of the old ”death strip” are allegedly still below the soil. Gardening (especially growing food) is therefore done mostly in flowerpots, also due to the fact that the soil might be contaminated with old military /death strip equipment. [4]
Innovation aspects:	Residents try not to buy any of their building materials and instead search for and use abandoned materials, furniture and everything else that might come in handy and craft and build their own homes (mainly Tipis) by themselves. [1] Many residents display their compilations of “pre-loved” items they have found and saved from their destiny of waste items around their yurts and in the small spaces they have appropriated in front of their yurts (thus functioning as a front yard). [4]
Comments & references	
Additional comments:	
Copyright of pictures:	Photos taken by Julia Zeilinger (during field visit 5th of May 2019)
Additional references:	[1] N.N.s.a: Teepeeland. Kultur- und Nachbarschaftsprojekt. https://teepeeland.wordpress.com/ [2] B.Z.-Video (2014): Teepee Land. https://www.youtube.com/ [3] German-Ness (2015): Hippie Leben am Spreeufer - das Teepeeland - GERMAN-NESS in Berlin. https://www.youtube.com/ [4] Gedächtnisprotokoll: Field visit Teepeeland 5.5.2019 [5] FNP (Flächennutzungsplan Berlin), aktuelle Arbeitskarte. https://fbinter.stadt-berlin.de/fnp/index.jsp?Szenario=fnpak [6] Couchsurfing: Teepee Land. https://www.couchsurfing.com/people/teepee-land/ [7] Das große (Arbeits-)Los 5/5 Teepeeland (dbate.de Videotagebuch) 2016. https://www.youtube.com/watch?v=gelB08bwx3o

Image 157: Shower structure; Julia Zeilinger

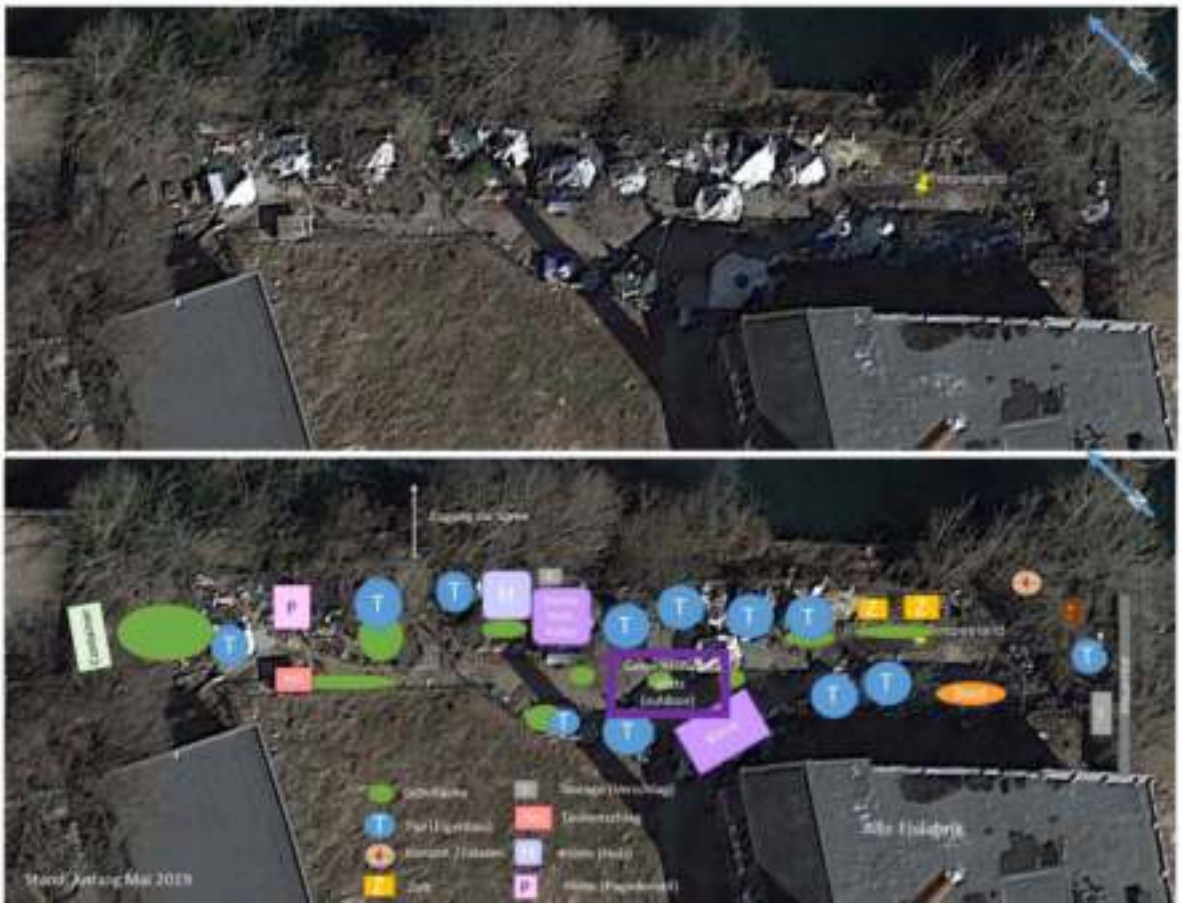


Image 158: Julia Zeilinger

Image 159: Julia Zeilinger

Image 160: Julia Zeilinger

Image 161: Julia Zeilinger

Image 162: Julia Zeilinger

Image 163: Toilet structure; Julia Zeilinger

66. TENTS IN TIERGARTEN, BERLIN

Project website:

https://www.tagesspiegel.de/berlin/berlin-mitte-wieder-wurde-ein-obdachlosencamp-in-berlin-geraeumt/23857000.html (newspaper article)

Image 164: Olaf Selchow, https://www.bz-berlin.de/berlin/mitte/die-insel-der-obdachlosen-im-tiergarten

Image 165: Paul Zinken/dpa, https://www.t-online.de/nachrichten/panorama/kriminalitaet/id_82604722/brennpunkt-berlin-tiergarten-polizei-raeumt-illegale-obdachlosen-zeltlager.html

Project description:

Tents in open space

User specific aspects	
User groups:	homeless people
Drivers/triggers:	homelessness; need for housing
Location and environment	
Location:	Tiergarten Berlin, close to S-Bahn 52.5144 13.3367 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Informal
Climate:	Continental
Physical properties	
Site type:	park; zoning plan: green area (“Grünfläche”)

Construction type:	Tents
Foundation type:	no foundation
Building type:	house (1-2 units per building)
Equipment & facilities:	not specified; assumption: residents depend on public facilities for sanitation; public food distributions,...
Connection to neighboring buildings:	detached (free standing)
Materials used:	tents, tarpaulins
Storey count:	1
No. of persons per unit:	not specified; assumption: 1-2
Utilities	
Water supply:	Not connected to centralised water supply system
Sanitation system:	Not connected to centralised wastewater system
Solid waste management:	not specified; assumption: waste disposal (Source: tagesspiegel.de)
Implementation data	
Implemented?	Yes
Year of construction:	2019
Plot ownership:	public
Life cycle aspects	
Expected time of PUE on-site:	apparently, the camps get banished regularly by the police so homeless people move to another spot (Source: tagesspiegel.de)
Planned reuse/recycling:	not specified; assumption: homeless people reuse tents and tarpaulins in next camp again

Use of reused/recycled materials during construction:	not specified; assumption: homeless people reuse tents and tarpaulins in next camp again
Comments & references	
Additional references:	https://www.tagesspiegel.de/berlin/berlin-mitte-wieder-wurde-ein-obdachlosencamp-in-berlin-geraeumt/23857000.html https://www.abendblatt-berlin.de/2019/01/16/obdachlosenlager-im-ulap-park-geraeumt/ https://www.tagesspiegel.de/themen/reportage/obdachlose-im-berliner-sommer-wenn-hitze-zur-gefahr-wird/24513512.html https://fbinter.stadt-berlin.de/fnp/index.jsp?Szenario=fnpak

67. CAMP BERGHAIN, BERLIN

Project website:

https://deutsch.rt.com/kurzclips/57174-berlin-hauptstadt-obdachlose-zeltlager/ (newspaper article)

Image 166: https://deutsch.rt.com/kurzclips/57174-berlin-hauptstadt-obdachlose-zeltlager/

Project description:

"For months now, homeless people have been sleeping next to famous Berghain disco. They have set up a tent camp in the immediate neighborhood of the disco, as footage taken on Monday shows. Along the way to Warschauer Strasse, there are said to be more such homeless camps. Homeless people, migrants, drug addicts and punks live in them." (Source: rt.com, 17.09.2017)

User specific aspects	
User groups:	homeless people (“Homeless people, migrants, drug addicts and punks”; Source: rt.com)
Drivers/triggers:	lack of affordable housing
User experience:	"Hotz from Bavaria says he is only ever here in the summer. 'When it gets cold, I hitchhike to Spain, Barcelona. You can always find something,' says Hotz. His Polish friend next to him, who has been living on the on the street for 21 years, also lives there for the winter months. In general, from December onwards almost exclusively Eastern Europeans shelter in the tents in this green are in Friedrichshain." (Source: rt.com)

Location and environment	
Location:	Area next to Helsingforser Straße, Berlin, Germany 52.5096 13.4454 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Informal
Climate:	Continental
Physical properties	
Site type:	Mixed building area M2 (“Gemischte Baufläche M2”)
Construction type:	tents without foundation
Foundation type:	None
Building type:	house (1-2 units per building)
Weather resistance:	
Connection to neighboring buildings:	detached (free standing)
Materials used:	tents (prefabricated)
No. of buildings:	Assumption: around 40 because the newspaper says that around 70 people live there (Source: Berliner Zeitung)
No. of residential units:	Assumption: around 40
Storey count:	1
Utilities	
Water supply:	Not connected to centralised water supply system
Sanitation system:	Not connected to centralised wastewater system; according to the newspaper: feces can be found all over the area
Solid waste management:	according to the newspaper: waste disposal on site

Implementation data	
Implemented?	Yes
Year of construction:	2012
Plot ownership:	Assumption: public
Life cycle aspects	
Expected time of PUE on-site:	"'This is a free state here,' says tent owner Marko. The camp has been around for five years, he says. 'I come here every summer, like many others. It's peaceful here, no violence, and even the police leave us alone,' says Illi, who is actually from Switzerland." (Source: berliner-zeitung.de)
Expected total life time:	expected to be closed by the police in 2017
Comments & references	
Additional comments:	
Additional references:	https://deutsch.rt.com/kurzclips/57174-berlin-hauptstadt-obdachlose-zeltlager/ https://www.berliner-zeitung.de/berlin/obdachlose-in-berlin-70-menschen-leben-in-einem-wilden-lager-neben-dem-berghain-28150596

68. TENT CITY 3 AT UNIVERSITY CONGREGATIONAL UCC, SEATTLE

Project website:

https://www.seattletimes.com/seattle-news/homeless/seattles-most-famous-legal-tent-camp-moves-to-an-illegal-spot-for-the-first-time-in-years/

Image 167: Chetanya Robinson, https://crosscut.com/2016/04/why-uw-is-thinking-of-hosting-a-tent-city

Image 168: Ken Lambert / The Seattle Times, https://www.seattletimes.com/seattle-news/homeless/seattles-most-famous-legal-tent-camp-moves-to-an-illegal-spot-for-the-first-time-in-years/

Project description:

”SHARE/WHEEL’s Tent Cities are portable, self-managed communities of up to 100 homeless men and women. SHARE/WHEEL’s Tent Cities are democratically organized. They operate with a strict Code of Conduct which requires sobriety, non-violence, cooperation, and participation. Security workers are on duty 24 hours a day. Litter patrols are done on a daily basis. Tent Cities provide their own trash removal and port-a-potties. Bus tickets are provided to each participant each day so s/he can get to work or appointments. There is a food preparation area. Volunteers bring hot meals most evenings to both Tent Cities. Tent Cities are needed because there is not enough indoor shelter for all who need it in King County. Tent Cities provide a safe place to leave your belongings, flexible hours for workers, and the ability for couples to stay together. Tent City3 started in 2000. It operates mainly in the City of Seattle. It currently is at Haller Lake United Methodist Church (13055 NE 1st), but is moving Saturday, October 29th to Prince of Peace Lutheran Church in Shoreline (14514–20th NE) where it will remain until late January 2012. There is an excellent network of support for Tent City3. Greater Seattle Cares is a vehicle for local communities to connect with Tent City 3 for the provision of the residents’ daily needs, including scheduling hot meals for the camp. Please visit their website at http://greaterseattlecares.org/mission.html” (Source: facebook.com)

Particularities of the Project:

organized and legal tent city that moves around every 90 days.

“The oldest continually operating outdoor encampment in the nation” (Source: seattletimes.com)

User specific aspects	
User groups:	homeless people
Drivers/triggers:	legal living space for homeless people
Gender-sensitive aspects:	WHEEL is one of the partners/founders of the Tent City. "The Women's Housing, Equality and Enhancement League (WHEEL) is a nonprofit and non-hierarchical group of homeless and formerly homeless women working on ending homelessness for women. WHEEL is all about empowerment and action. WHEEL is the women-only, women-concerned sister organization to SHARE (Seattle Housing and Resource Effort). Both WHEEL and SHARE provide self-managed shelters - including Tent Cities." (Source: sharewheel.org)
Location and environment	
Location:	Northeast Seattle Seattle, Washington 98105, USA 47.6615 -122.3116 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	varying; in this case: Multi-Family Zoning (Generalized) (Source: seattle.gov)
Plot area:	800 m²
Construction type:	Tents
Foundation type:	tents are put on pallets (see Image 168)
Building type:	house (1-2 units per building)
Equipment & facilities:	"infrastructure of a camp - a kitchen, bathrooms, pallets for tents"
Connection to neighboring	detached (free standing)

buildings:	
Materials used:	tents and other structures: portable toilets, kitchen, bathrooms, pallets for tents, ... (Source: seattletimes.com)
No. of buildings:	Assumption: up to 40 because there are 40 residents
No. of residential units:	Assumption: up to 40
Storey count:	1
Utilities	
Water supply:	Not connected to centralized water supply system; Assumption: water connection should be somewhere close (Source: crosscut.com)
Sanitation system:	Not connected to centralized wastewater system; portable toilet and hand washing stations are provided
Solid waste management:	"Q: What measures are proposed to handle refuse and human waste on proposed sites? A: Tent City reports that a dumpster would be provided for the handling of refuse and would be regularly collected. Tent City states that residents are forbidden to litter the camp or the surrounding neighbourhood. Tent City says that it conducts regular patrols to monitor adjacent streets and sidewalks to ensure they are kept clean. Anecdotal reports from other cities indicate that previous neighbors have commented on the cleanliness of their streets during the tenure of Tent City, due to these regular patrols. Tent City states that it would provide well maintained, portable toilets sufficient to the needs of up to 100 residents. Hand washing stations would be available adjacent to these toilets. Public Health staff members will monitor these conditions." (Source: http://www.sharewheel.org/tent-city-f-a-q-s)
Implementation data	
Implemented?	Yes
Year of construction:	2000 (Source: crosscut.com)
Designer:	
Client:	SHARE/WHEEL, is the combined advocacy efforts of the Seattle-Housing and Resource Effort (SHARE) and the Women's Housing Equality and Enhancement League

	(WHEEL). They have operated tent cities in the City of Seattle and other local cities in cooperation with the faith-based community.
Executing company:	not specified; assumption: residents or organisation
Cost of construction:	
Funding:	donations
Construction time:	assumption: within some days; the camp stays for 90 days at one spot
Plot ownership:	not specified. Assumption: private, belonging to nearby church
Life cycle aspects	
Expected time of PUE on-site:	90 days
Reversibility:	assumption: completely reversible
Planned reuse/recycling:	reuse of materials and units on other spots when the camp moves
Use of reused/recycled materials during construction:	See above
Adaptability:	not specified; new residents can simply be hosted by adding a tent; up to 100 persons
Repurpose, reuse, new development of site/building:	not specified; assumption: back to parking lot
Comments & references	
Additional comments:	
Additional references:	https://www.facebook.com/Tent-City-3-233907999985618/about/?ref=page_internal http://www.sharewheel.org/Home/wheel http://www.seattle.gov/ (PDF) https://crosscut.com/2016/04/why-uw-is-thinking-of-hosting-a-tent-city

	http://www.sharewheel.org/tent-city-f-a-q-s https://mynorthwest.com/1485991/seattle-homeless-camp-tent-city-three/ https://spu.edu/voices/articles/tools-seattle-tent-city-living

INTERNATIONAL TEMPORARY HOUSING EXAMPLES – GROUP B

For the following examples, solid data is available, but data gaps exist in at least one of the categories considered.

69. MÊME MEADOWS EXPERIMENTAL HOUSE

Main source:

https://www.dezeen.com/2013/01/16/meme-meadows-experimental-house-by-kengo-kuma-and-associates/

Image 169: https://archello.com/story/17862/attachments/photos-videos/7

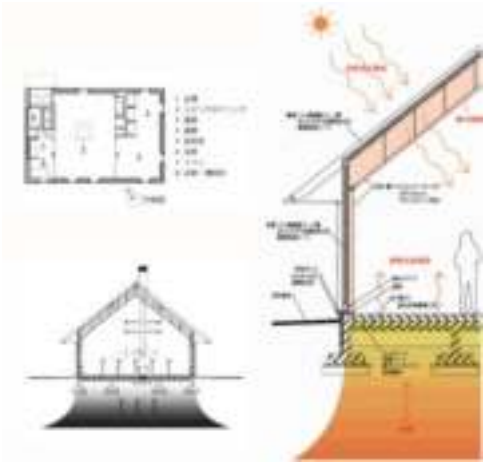


Image 170: https://www.metalocus.es/en/news/memu-meadows-meme-prototype-kengo-kuma

Project description:

Pop-up house inspired by the traditional local architecture suited for extreme climate conditions. The Experimental House was constructed around a coated larch frame, and it has a thick layer of polyester insulation sandwiched between the polycarbonate cladding of the exterior and the glass-fibre fabric of the interior. This insulation was made using recycled plastic bottles and it allows light to pass into the house through the walls.

Particularities of the Project:

Sustainable building made with ecological materials but without losing the architectural Japanese tradition. It's suitable for any kind of climate conditions. The house is connected to contemporary technological advances, but intrinsically in continuity with traditional constructive practices.

User specific aspects	
User groups:	people who live in extreme climate conditions
Location and environment	
Location:	158-1 Memu, Taiki-cho, Hirogun, Hokkaido, Japan

	42.46733, 143.3751 [Show on map]
Surrounding environment:	Rural environment
Climate:	Polar
Physical properties	
Construction type:	Rigid frame – wood
Building type:	house (1-2 units per building)
Foundation type:	Concrete foundation plinth beam
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ local Japanese larch wood, covered on the outside with a polyester membrane painted with fluorocarbon, and on the inside by a removable membrane of glass fiber fabric. ○ membranes, as well as the thermal insulation of polyester fiber obtained from recycled polyethylene bottles that fills the larch structure, are translucent and guarantee a particular light atmosphere.
Storey count:	1
Built area:	79,50 m²
Integration of recreational and/or productive opportunities:	Integration with traditional Japanese architecture
Utilities	
HVAC:	○ fire pit for heating ○ heat piping system for floor
Implementation data	
Implemented?	Yes
Year of construction:	2011
Designer:	Kengo Kuma & Associates / Kengo Kuma, Takumi Saikawa

Client:	
Executing company:	Kengo Kuma & Associates / Kengo Kuma, Takumi Saikawa Technical consulence: Lab of Tomonari Yashiro at the Institute of Industry Science Tokyo University / Bumpei Magori
Life cycle aspects	
Use of reused/recycled materials during construction:	Insulation material from recycled polyethylene bottles that fills the wooden structure
Innovation aspects:	Its effectiveness in particularly cold climates is the ability to accumulate the heat radiated by a central fireplace always on, which organizes a particular space around itself and in the thickness of the layers of material. The particular spatial fluidity allows convective air currents to radiate easily from the hearth and from the floor into living spaces. The soil is used as thermal insulation and hot water pipes under the floor to generate heat. The mass of warm air between the wall membranes circulates and rises up to the roof, keeping the whole building constantly warm.

70. PROTOTYPE ME-01

Main source:

https://www.behance.net/gallery/1551693/ME-01

Image 171: Christian Castro Sanchez

Image 172: Christian Castro Sanchez

Project description:

Prototype ME-01 is a pre-fabricated, easily assembled module, designed as a temporary house for a small family in an emergency situation. Through the use of built-in furniture the space can serve as a social area during the day and as a bedroom during the night.

Particularities of the Project:

It becomes self-sufficient in terms of energy consumption, through the use of solar panels and a system of rainwater collectors that supply the modules basic functions.

User specific aspects	
User groups:	disasters victims
Physical properties	
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Foundation type:	Circular counterweights
Connection to neighboring buildings:	detached (free standing)

Materials used:	Prefabricated curtain walls and panels
No. of residential units:	1
Storey count:	1
No. of persons per unit:	4
Built area:	
Utilities	
Water supply:	Rainwater collection. The water can be used to perform everyday chores and other basic functions.
Sanitation system:	Container-based sanitation
Electricity:	Photovoltaics
Implementation data	
Designer:	Christian Castro Sanchez
Life cycle aspects	
Reversibility:	It can be easily moved to any location also after the construction.
Adaptability:	Very easy to mount everywhere.
Innovation aspects:	This prefabricated unit can be pulled together without any difficulty. The module will prove to be of great help when an urgent situation crops up. It has enough space to accommodate a small family and comes with all the basic facilities. The useful module comes wedged with solar panels, which produces enough energy to perform different tasks. Well, the self-sufficiency does not end here! It has been wedged with a system to collect rainwater as well. The water can be used to perform everyday chores and other basic functions.

71. SLIDING HUB

Main source:

https://www.designboom.com/design/gabriele-aramu-sliding-hub/

Image 173: Gabriele Aramu

Image 174: https://www.designboom.com/design/gabriele-aramu-sliding-hub/

Project description:

Modular housing unit created for housing flexibility within the confines of a city. This prefabricated temporary building may be transported and installed within any environment. The insulated and liveable modules may be joined together or separated for single to multiple person dwelling.

Particularities of the Project:

The possibility of being able to create different housing units simply by changing position to the modules

User specific aspects	
User groups:	singles, students, families
Physical properties	
Plot area:	Depends on the type of modules.
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Foundation type:	Posing on the ground
Weather resistance:	

Equipment & facilities:	The prefabricated temporary building may be transported and installed within any environment. The insulated and livable modules may be joined together or separated for single to multiple-person dwelling
Connection to neighboring buildings:	detached (free standing)
Materials used:	Prefabricated curtain walls and panels
No. of residential units:	1
Storey count:	1
No. of persons per unit:	From 1 to 5, depending on the type of modules.
Built area:	Depends on the type of modules.
Implementation data	
Designer:	Gabriele Aramu
Life cycle aspects	
Adaptability:	It may be transported and installed within any environment. the insulated and livable modules may be joined together or separated for single to multiple-person dwelling

72. TANZANIA RURAL HOUSING

Main source:

http://www.garrisonarchitects.com/projects/tanzania-rural-housing

Image 175: Garrison Architects

Image 176: Garrison Architects

Project description:

Pop-up housing born because of Tanzania lacks housing for over 3 million low- and middle-income households, and the number is increasing an average of 200,000 homes per year.

Particularities of the Project:

The goal is to provide quality, efficient and affordable new homes that are capable of being pre-fabricated off-site, and mass produced to meet the immense demands of the housing shortage. We designed a unit that is simple, cost-efficient, structurally sound, energy efficient, and sustainable. Off-the-grid, energy self-sufficient mechanical systems are utilized, including composting toilets, solar hot water tanks, and photovoltaic panels, which enables the homes to be placed where they are most needed, without the extensive coordination required for centralized utilities.

User specific aspects	
User groups:	Homeless people
Location and environment	
Location:	Tanzania
Surrounding environment:	Rural environment
Climate:	Dry (desert/semi-arid)

Physical properties	
Site type:	Green field
Construction type:	Prefabricated building
Foundation type:	No foundations
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Prefabricated curtain walls and panels
No. of residential units:	1
Storey count:	1
No. of persons per unit:	4
Utilities	
Sanitation system:	composting toilets
Electricity:	photo-voltaic panels
HVAC:	solar hot water tanks
Implementation data	
Year of construction:	2018
Designer:	Garrison architects
Client:	Tanzania Government
Funding:	State funded
Plot ownership:	Tanzania Government
Life cycle aspects	

Innovation aspects:	Energy self-sufficient mechanical systems are utilized, including composting toilets, solar hot water tanks, and photo-voltaic panels, which enables the homes to be placed where they are most needed, without the extensive coordination required for centralized utilities.

73. HOME BOX

Main source:

https://www.stadtentwicklung.berlin.de/staedtebau/baukultur/berlin-award/download/ba2016_projektbeitraege_kl.pdf

Image 177: https://www.archdaily.com/287696/home-box-architech/508f470c28ba0d2956000095-home-box-architech-Image

Image 178: http://www.slawik.net/Images/bautenundprojekte/pdf/expose%20homebox_080413.pdf

Project description:

wooden container put upright to build a freestanding three-story building with 14,35 m2; can be used alone or connected with another Home Box.

Particularities of the Project:

upright wooden container

User specific aspects	
User groups:	variable uses like guest house at temporary events (soccer world cup, ...), private house, office, other uses... (Source: Slawik)
Drivers/triggers:	project initiated by the architect

Location and environment	
Type of setting:	not specified; variable
Climate:	Temperate
Physical properties	
Site type:	variable
Construction type:	Modular
Foundation type:	foundation needed (concrete or other)
Building type:	house (1-2 units per building)
Equipment & facilities:	kitchen, furniture
Connection to neighboring buildings:	detached (free standing)
Materials used:	Wood
No. of buildings:	1 (or more)
No. of residential units:	1
Storey count:	3
No. of persons per unit:	1
Built area:	7 m²
Area per person:	14 m²
Utilities	
Water supply:	brought with canisters to the dwelling; can be connected to centralised water supply system
Sanitation system:	Not specified
Electricity:	connected to local network; can be independent (self-sufficient) also

Implementation data	
Implemented?	Yes
Year of construction:	2009
Designer:	Prof. Han Slawik Architekt, architech – Studio für Architektur und Technik
Client:	Variable
Cost of construction:	25.000€
Funding:	Private
Plot ownership:	Variable (private)
Life cycle aspects	
Reversibility:	not specified; can be moved easily
Adaptability:	if more space is needed it can be connected with another home box
Comments & references	
Additional comments:	the unit has the measures of a shipping container and can be moved easily on a truck, train, ship, ...
Additional references:	http://www.slawik.net/

74. PORTABLE LOG CABIN

Main source:

https://inhabitat.com/flake-house-by-olgga-architects/

Image 179: OLGGA

Image 180: OLGGA

Project description:

two-piece transportable log cabin

Particularities of the Project:

The cabin can be utilized for anything, and if it's a custom model it is available in any desired size.

Location and environment	
Location:	Finland
Surrounding environment:	Rural environment
Climate:	Continental
Physical properties	
Site type:	green field
Plot area:	22 m²
Construction type:	Prefabricated building, to be transported on the construction site
Foundation type:	Wood beams

Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Wood, glass
No. of buildings:	1 (or 2, as seen in pictures at Dezeen or Olgga)
No. of residential units:	1
Storey count:	1
No. of persons per unit:	2
Implementation data	
Year of construction:	2009
Designer:	Olgga
Executing company:	Olgga
Cost of construction:	21.000€ (net price)
Life cycle aspects	
Repurpose, reuse, new development of site/building:	pop-up units
Comments & references	
Additional references:	https://www.dezeen.com/2009/05/22/flake-house-by-olgga-architects/ http://olgga.fr/flake-house/

75. MICRO HOUSE

Main source:

http://www.mdpi.com/2071-1050/10/3/718 (paper)

Image 181: Dong et.al., 2018

Project description:

single family post-disaster housing with PV-panels allowing one month of energy-autarchy; can be used also for construction workers

User specific aspects	
User groups:	people affected by disasters, on-site workers
Drivers/triggers:	Disaster
Location and environment	
Location:	Nanjing, China. No further details specified
Surrounding environment:	Urban environment
Type of setting:	not specified; assumption: formal
Climate:	Temperate
Sea level:	20 m
Physical properties	

Construction type:	Prefabricated building
Foundation type:	reversible foundation
Building type:	house (1-2 units per building)
Weather resistance:	not specified; Assumption: adjusted for local weather conditions
Equipment & facilities:	one bedroom, bathroom, kitchen, outdoor platform
Connection to neighboring buildings:	detached (free standing)
Materials used:	Aluminium, Steel, Concrete, Wood, Glass, Polyurethane, Rock wool, Solar photovoltaic cell
Storey count:	1
No. of persons per unit:	a family with up to 3 persons
Built area:	30 m²
Area per person:	10 m²
Utilities	
Water supply:	Assumption: connection to centralized water supply
Sanitation system:	Assumption: connection to centralized sewage system
Electricity:	Area of solar photovoltaic cell: 20 m² = 12 pieces of PV; Angle of solar photovoltaic cell 7.5°; Photo-electro transition rate 18%; Generation power 2760 W (12 x 230 W)
HVAC:	solar thermal system
Implementation data	
Implemented?	Not specified. Assumption: yes, but no further details found
Executing company:	an aluminium building materials factory in Nanjing, China
Life cycle aspects	

Expected total life time:	20 years (service life)
Reversibility:	can be dismantled completely
Planned reuse/recycling:	"Most building materials of the Micro House can be reused or recycled at the end of the building's life cycle." Expected service life (Years): o Structure: Aluminium profile and Steel fastener (100 years) o Envelope: Aluminium sheets (40y), Wooden boards (30y), Insulation (40y), Aluminium doors and windows (60y) o Equipment: Solar photovoltaic cell (20y) o Platform: Wooden boards (30y)
Potential/planned secondary use concepts for TH-units:	not specified; used only for residential use
Innovation aspects:	1-month energy self-sufficiency
Comments & references	
Additional references:	Dong, L.; Wang, Y.; Li, H.X.; Jiang, B.; Al-Hussein, M. (2018): Carbon Reduction Measures-Based LCA of Prefabricated Temporary Housing with Renewable Energy Systems. Sustainability 10, 718.

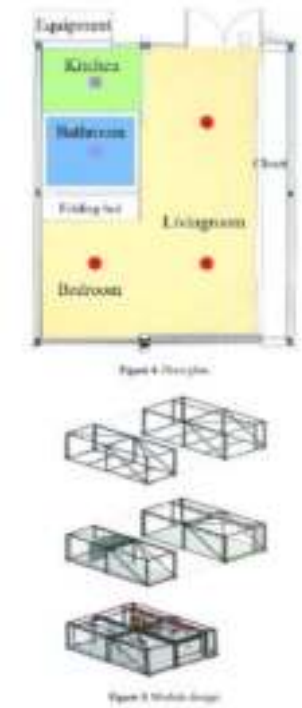


Image 182: Dong et.al., 2018

76. CARMEL PLACE

Main source:

http://narchitects.com/work/carmel-place/

Image 183: nArchitects

Image 184: nArchitects

Project description:

Carmel Place, designed by nArchitects—NYC's first all micro-unit apartment building. Fifty-five loft-style units, ranging from 260 to 360 square feet, sit in four slim "mini-towers" of unequal height, which were built using modular construction. Forty percent of the units are earmarked as affordable, while the rest are market rate. Units are designed to feel spacious despite their small dimensions, with 9-foot-8-inch ceilings and clever features like a fold-down kitchen table/counter and linear storage loft. (Source: Architectmagazine)

Particularities of the Project:

competition-winning project; exception of currently allowed 400sf (= 37 m²) minimum apartment size

"The adAPT NYC competition was created as part of the administration's New Housing Marketplace Plan to introduce additional choices within NYC's housing market and accommodate the city's growing small household population. (..) Carmel Place proposes micro-unit living units, that are smaller than the currently allowed 400sf for new construction, albeit with increased and more integrated strategies for shared amenities."

"The design team's biggest challenge was to create a potentially new housing paradigm that could on the one hand be systemically replicated, and that on the other would produce a big social impact, within a very tight set of regulatory and economic constraints. Understanding that residents of small apartments necessarily live across different scales, the design of the

building's exterior form, distribution of amenities, and interiors of the units, followed a logic of nested scales." (Source: Architectmagazine)

User specific aspects	
User groups:	middle-class New York residents
Drivers/triggers:	It's the winning proposal in the adAPT NYC an initiative launched as part of former Mayor Bloomberg's administration's New Housing Marketplace Plan to accommodate the city's growing small household population.
Social mix & cohesion:	14 apartments for two residents that earn less than $48,350/year; "40% (22) of the 55 rental units at Carmel Place are dedicated for affordable housing, of which 8 are Section 8 – reserved for formerly homeless US veterans (these apartments will be provided with complementary integrated furniture)" (Source: Narchitecs) - there are doubts whether the apartments have been given to the veterans (Source: Thespruce)
Location and environment	
Location:	335 E 27th St, New York, NY 10016, USA 40.7399 -73.9774 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Sea level:	24 m
Physical properties	
Site type:	Residential Zone (Source: Zola 2) Land use: Mixed Residential & Commercial Buildings (Source: Zola)
Plot area:	440 m² (Source: Zola)
Construction type:	prefabricated building; foundation and ground floor built on site

Foundation type:	not specified; assumption: concrete
Building type:	building (more than 2 units per building)
Weather resistance:	adjusted to local weather conditions
Equipment & facilities:	bathroom; kitchen, living and sleeping in one room
Connection to neighboring buildings:	detached (free standing)
Materials used:	not specified; see Image 187
No. of buildings:	
No. of residential units:	55 “loft-like rental apartments”
Storey count:	9
No. of persons per unit:	1-2
Built area:	not specified; assumption: plot entirely built
Area per person:	up to 33 m²
Integration of recreational and/or productive opportunities:	“Carmel Place’s communal amenities are accessible to all residents. Designed for multiple functions, they are located in the building’s best places, enhancing the tenants’ active connection to the community. A sunfilled and over-sized lobby connects Mt Carmel Place’s sidewalk on the west to an exterior resident porch on the east. Conceived of as an interior street, this flexible space could, in principle, be used to host a dinner party for all the residents of the building. In addition to containing lounge spaces with built-in seating, the lobby opens to a large street-level and fully glazed gym that fronts the pedestrian 27th street and adjacent park. In the cellar, residents have access to a den, storage, bike storage and laundry, while at the 8th floor, a community room with a pantry leads onto a public roof terrace with sweeping city views.” (Source: nARCHITECTS)
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connection to centralized energy grid

HVAC:	not specified
Solid waste management:	municipal waste collection
Implementation data	
Implemented?	Yes
Year of construction:	2015
Designer:	nARCHITECTS Team
Client:	Monadnock Development / NYC Department of Housing Preservation and Development
Executing company:	Capsys Corp (modular units), other collaborators: Structural Engineer: DeNardis Engineering LLC MEP engineer: A. Joselow, P.C. Civil Engineer and Landscape: Langan Engineering LEED Consultant: Taitem Engineering, PC Code Consulting: JM Zoning Consulting Architect (competition phase): Willis DeLaCour Marketing Consultant: Corcoran Sunshine Graphic Design: Project Projects Builders: Monadnock Construction
Cost of construction:	$12.95 million (Source: Architectmagazine)
Funding:	Private. Assumption: Subsidized
Construction time:	not specified (project lasted from 2012 to 2016 - nArchitects)
Plot ownership:	private
Life cycle aspects	
Expected time of PUE on-site:	not specified but assumed to be permanent
Reversibility:	not specified; modules maybe reusable if taken off, ground floor and foundation not
Adaptability:	not specified; assumption: not adaptable

Innovation aspects:	“groundbreaking use of modular construction” (Source: nArchitects); Small apartments for different users (social mix of middle-class residents and homeless veterans - unclear whether this intention was realized) with shared amenities in urban area
Comments & references	
Additional comments:	
Additional references:	http://www.architectmagazine.com/project-gallery/carmel-place_o https://www.thespruce.com/nycs-first-micro-unit-apartment-building-3017260 https://zola.planning.nyc.gov/lot/1/933/7501#17.85/40.73985/-73.97643 https://www1.nyc.gov/assets/planning/ https://www.dezeen.com/2016/02/01/carmell-place-micro-apartment-tower-new-york-city-narchitects-photos/#

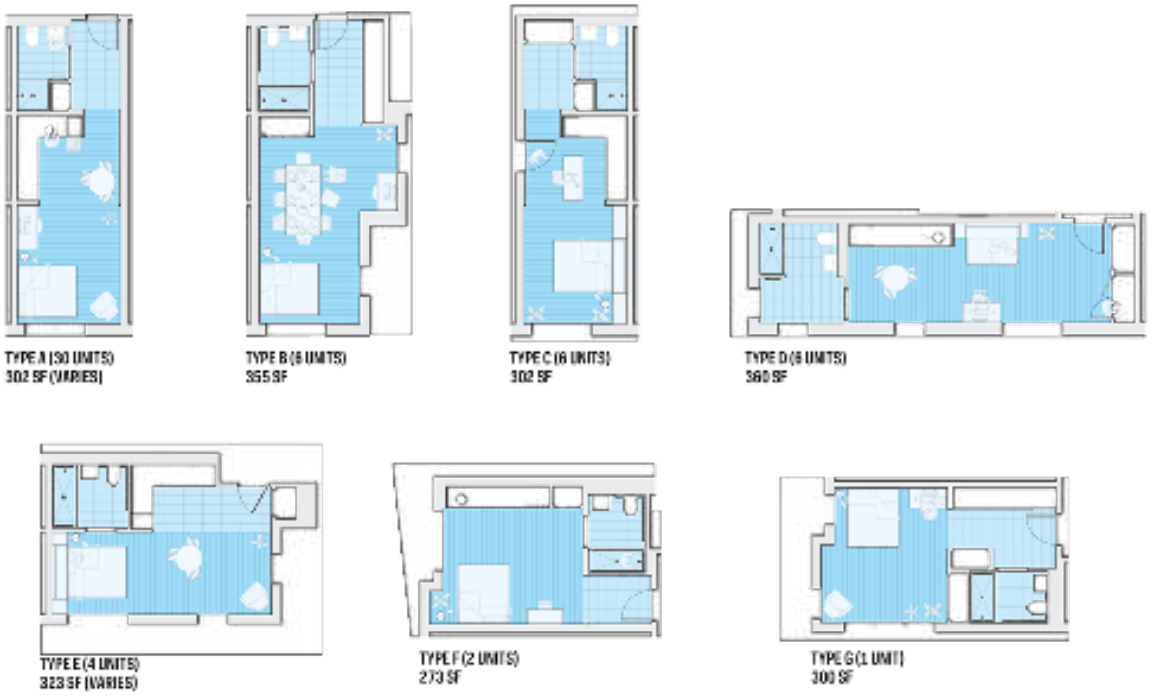


Image 185: https://www.dezeen.com/2016/02/01/carmell-place-micro-apartment-tower-new-york-city-narchitects-photos/#

77. ANEKI HOUSING FOR WOMEN

Main source:

http://vaha.ca/projects/

Image 186: https://vaha.ca/projects/

Image 187: https://vaha.ca/projects/

Project description:

39 homes for the homeless built and tenanted.

Atira Women's Resource Society will operate the Powell Street building, which is meant for women in the Downtown Eastside. Support services will include life skills training, counselling, meals and referrals to health and community-based programs. The project generated 15 comment cards at an open house event, along with four emails. Those in support indicated there is a need for this type of housing in Vancouver and some called for more temporary modular housing, according to the city, while those in opposition outlined concerns about other non-profit and social housing developments nearby, for the future management of the building and its impact on the surrounding neighbourhood. Ultimately, the goal is to build 600 modular housing units in complexes scattered throughout the city thanks to $66 million in provincial funding. Each new unit is around 250 sq. ft. and contains a bathroom and a kitchen. The building has a shared laundry and communal amenity spaces (indoor and outdoor). Seven suites are designed with customized layouts and user-friendly adaptive features to accommodate persons with accessibility requirements.

City of Vancouver (funding) & BC Housing & Atira Property Management Inc. & VAHA Vancouver Affordable Housing Agency

Particularities of the Project:

"The City will also hold community information sessions to share more details on the proposed project," the city said in a statement. "Feedback gathered will inform the Director of Planning's consideration of the development permit and provide BC Housing and the selected non-profit operator with feedback on the proposed operation of the buildings."

"If approved, the building would be managed by a nonprofit housing operator selected by BC Housing and would include 24/7 support services for tenants." (Source: vancouverisawesome.ca)

Temporary modular housing is:

- Quicker to construct than a traditional building

- Reusable
- Ideal for sites that are vacant while waiting to be developed

Modular housing is manufactured off site and assembled on-site to create a building. The temporary buildings would provide much-needed housing for five years, with a possibility to extend another five years, while more permanent housing is being built. Each building can be quickly relocated and configured to fit different sites. (Source: vancouver.ca)

Atira, the non-profit housing operator, is committed to operating a supportive housing program for women living in a shared living environment. They will be responsible for the building maintenance and will be providing support to tenants, including:

- Individualized support plans
- Support to attend or receive health services
- Opportunities for volunteer work
- Connections to community groups
- Opportunities for social events

(Source: vaha.ca

User specific aspects	
User groups:	homeless women, precariously housed women and underhoused women.
Drivers/triggers:	homelessness. $66 million in provincial funding was invested to build 600 modular homes for the homeless.
Social mix & cohesion:	shelter for women “In order for the Aneki Housing for Women CAC to be effective, it is important to limit overall committee size while maintaining a balance of voices at the table. Therefore, Aneki Housing for Women CAC membership is comprised of approximately 15 individuals , which may include representation as follows: 5 x community members (local resident and community organizations, businesses, local area residents, etc.), 2 x Atira representatives, including the Program Manager and as required, a Senior Staff, 1 x resident from Aneki Housing for Women as appropriate, 1 x local school Principal, 1 x Vancouver Police Department representative, 1 x City of Vancouver representative, 1 x BC Housing representative, 1 x Vancouver Coastal Health representative (Source: vancouver.ca)
Gender-sensitive aspects:	housing for women only
Location and environment	
Location:	525 Powell Street, Vancouver

	49.2834, -123.0928 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	oceanic or marine west coast
Sea level:	15 m
Physical properties	
Site type:	zoned as “Comprehensive Development District”
Construction type:	modular
Building type:	building (more than 2 units per building)
Equipment & facilities:	bathroom and kitchen
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
No. of residential units:	39
Storey count:	3
No. of persons per unit:	1
Built area:	250 m²
Area per person:	23,2 m²
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	assumption: grid connection
HVAC:	assumption: district heating
Implementation data	

Implemented?	Yes
Designer:	Assumption: VAHA
Client:	City of Vancouver
Executing company:	Assumption: VAHA
Funding:	City of Vancouver Operational costs covered by BC Housing for up to 5 years with option to renew for 5 years
Construction time:	a neighbouring housing project (Chartrand Place) also for 39 people that has been built at the same time was completed in 90 days (Source: thestar.com and theglobeandmail.com)
Life cycle aspects	
Expected time of PUE on-site:	5 years (max 10)
Expected total life time:	5 years with possibility to extend for another 5 years
Repurpose, reuse, new development of site/building:	“The so-called Sugar Mountain tent city was shut down by the city over health and safety concerns in December 2017, and it took just nine weeks to put together the 39-unit modular building on the site.” (Presumably Chartrand Place) “Officials will soon open a second such complex just down the street from the Sugar Mountain site that will be for women only.” (Presumably Aneki housing) (Source: thestar.com)
Comments & references	
Additional comments:	“The units will be rented out at shelter rates, $375 per month, and come with a kitchen, bathroom, and housing supplies like bed sheets and dishes.” (Source: thestar.com)
Additional references:	http://vaha.ca/projects/ https://www.vancouverisawesome.com/courier-archive/news/city-holds-open-house-for-olympic-village-modular-housing-complex-3069130 https://www.vancouverisawesome.com/2018/07/03/temporary-modular-housing-olympic-village/ https://vancouver.ca/files/cov/temporary-modular-housing-franklin-powell-information-boards.pdf https://www.thestar.com/vancouver/2018/04/27/modular-housing-project-for-the-homeless-pop-up-at-site-of-vancouver-tent-city.html

	https://www.theglobeandmail.com/canada/british-columbia/article-latest-modular-housing-project-for-homeless-opens-in-vancouver/

78. FEMA TEMPORARY HOUSING UNITS

Main source:

www.google.com

Image 188: FEMA

Image 189: FEMA

Project description:

Under the Housing Assistance provision of the Federal Emergency Management Agency's (FEMA) Individuals and Households Program, FEMA may provide temporary housing assistance to eligible applicants whose pre-disaster residence is inaccessible or uninhabitable as a direct result of a presidentially declared emergency or major disaster.

Particularities of the Project:

Multi-Family Lease and Repair: MLR is a form of Direct Temporary Housing Assistance that allows FEMA to enter contracts with multifamily property owners to lease and repair or make improvements to existing multi-family housing units (e.g., apartments). FEMA may utilize these types of units as temporary housing for eligible applicants who are unable to use Rental Assistance due to a lack of available resources. MLR is not intended to repair or improve individual units to rehouse existing tenants.

User specific aspects	
User groups:	people affected by disasters who are unable to use Rental Assistance due to a lack of available resources
Location and environment	
Location:	302 Delaney St, Alexander, ND 58831, USA

	47.8454 -103.6405 [Show on map]
Surrounding environment:	Urban environment
Type of setting:	Formal
Climate:	Temperate
Physical properties	
Site type:	partly residential, partly “parks and schools”, according to zoning map
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	They can be built both as detached than as in multiple rows
Materials used:	Curtain walls “FEMA trailers are manufactured from plastic, aluminium, and particle board, and are therefore somewhat flimsy and require more maintenance than a permanent structure. They are also poorly insulated, offer little sound insulation, and are known to sway in high winds.” (Source: Wikipedia)
No. of residential units:	1
Storey count:	1
No. of persons per unit:	2
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Implementation data	
Year of construction:	2016
Client:	FEMA

Executing company:	FEMA
Cost of construction:	20.000$
Funding:	State funded
Construction time:	Less than a month
Plot ownership:	FEMA may contract with property owners to lease non-multi-family properties (i.e., single family or properties with fewer than three units in one site, such as a duplex) to use as temporary housing.
Life cycle aspects	
Expected time of PUE on-site:	18 months
Comments & references	
Additional references:	Zoning map https://en.wikipedia.org/wiki/FEMA_trailer https://grist.org/politics/people-are-still-living-in-femas-toxic-katrina-trailers-and-they-likely-have-no-idea/

79. AIRCLAD SUFFOLK POD

Main source:

http://www.airclad.com/structure/

Image 190: Airclad

Project description:

A flat-packed, pop-up room to incorporate all the features typically expected from a hotel room. Used also for conventions, fairs and outdoor exhibitions and as additional part of an existing house.

Particularities of the Project:

interesting solution for having low cost and high speed rooms to integrate houses and hotels.

User specific aspects	
User groups:	tourists, local residents
Location and environment	
Location:	London (UK)
Surrounding environment:	Urban environment
Type of setting:	formal

Climate:	Continental
Physical properties	
Construction type:	Prefabricated
Foundation type:	No foundations
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	“The engineered aluminium main frame of the AirClad eXpo system is manufactured and assembled with various extruded profiles which incorporate a keder extrusion for the sliding in the air i nflated skin. The aluminium is treated with a double layer of powder coated paint for intensive and outdoor use. Standard coated in white and also available in a whole spectrum of RAL colours. The cross bracing connecting the frames are made off a powder coated 50mm diameter steel tubes and clip into stainless cast steel pucks. The whole of the frame system and floor are uniquely constructed without the use of nuts and bolts. The entire eXpo system simply clicks together allowing for a hassle free, very fast and safe installation. The fascia is designed on a 1m grid and exist of extruded aluminium supports designed to fix different types of panelling or glazing. An aluminium single or double sliding door system can be mounted into the grid, provided with handles and locks it provides a safe, wind resistant and easily accessible eXpo space. This fascia system comes standard finished with textured matt graphite powder coating and is on request available in other colours. For glazing of the fascia and doors we use 8mm polycarbonate on portable applications and 8mm plate glass for more permanent or long-term installations. The glazing is secured to the fascia with stainless steel screws and aluminium spreader washers. There is a checker plate aluminium ramp with all door systems to allow disabled access. These ramps are standard 1m deep and will be affected in angle by the local conditions.” (Source: Airclad)
No. of residential units:	1
Storey count:	1
No. of persons per unit:	2
Utilities	

Water supply:	Not connected to centralised water supply system
Sanitation system:	Not connected to centralised wastewater system
Electricity:	Connected to local grid
HVAC:	“The air cells on the AirClad system are all high frequency welded as sealed chambers. They will stay inflated over short periods of time however we do advise an air management system to ensure all temperature changes and other factors are managed. For events less than 3 days it is not necessary to run an air management system, but always good as maintenance back up. With permanent installations we supply air management systems standard, they run periodically when needed and draw very little energy, 1.4amps / 0.125Kw. The fan system is built inside a plastic weatherproof box 380mm by 480mm by 150mm. This box can be mounted onto the structure or under the flooring. For most events we supply this box mounted to a free-standing aluminium frame which can be positioned close or far from the structure in line with your preferred needs. If power distribution is required we supply the fan system with a distribution box taking 63 or 32amp to 16amp outlets.” (Source: Airclad)
Implementation data	
Year of construction:	2010
Designer:	Airclad
Executing company:	Airclad
Cost of construction:	
Funding:	
Construction time:	
Plot ownership:	
PUE-related patents:	
Life cycle aspects	
Expected time of PUE on-site:	

Expected total life time:	
Reversibility:	
Planned reuse/recycling:	
Potential/planned secondary use concepts for TH-units:	
Use of reused/recycled materials during construction:	
Adaptability:	
Repurpose, reuse, new development of site/building:	“We supply a transport and storage system for touring structures. For structures being installed for a long period of time they are palletized for the most efficient safe transportation from factory to venue. All structures are designed to work with the same storage and transport system so you can upgrade whenever is needed. The frames are supported on a steel powdered coated stillage. The fascia, cross bracing and doors all fit into a purpose built flight case with internal compartments to protect all the elements from each other. The air cells are in their own bags in a plastic flight case. Flooring is loaded onto the frame stillage along with the flight case for the fascia and air cells. The whole stillage is then load onto trucks as required. The stillage are used for all eXpo systems up to 12m wide and 20m deep.” (Source: Airclad)

INTERNATIONAL TEMPORARY HOUSING EXAMPLES – GROUP C

The following case studies are prototypes, examples in the development stage (which have not (yet) been inhabited under real living conditions), and examples with innovative detail aspects relevant to at least one project focal point (e.g. resource use, social interaction)

80. GETAWAY HOUSE

Main source:

http://www.garrisonarchitects.com/projects/getaway-house

Image 191: Garrison Architects

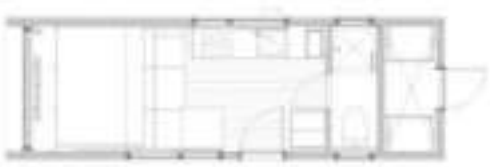


Image 192: Garrison Architects

Physical properties	
Plot area:	About 20 m²
Construction type:	Prefabricated building
Foundation type:	basement
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	curtain walls
No. of residential units:	1
No. of persons per unit:	1
Area per person:	20 m²
Implementation data	
Designer:	Garrison Architects
Cost of construction:	

Life cycle aspects	
Innovation aspects:	Completely movable house

81. THE BLOB

Main source:

https://www.designboom.com/architecture/dmva-blob-vb3/

Image 193: DMVA Architecten

Image 194: Frederik Vercryyse

Project description:

An office for xfactoragencies. It was designed as an extension to the house. Even though an unconventional shape, credit has to be given where it is due. This compact blob includes a bed, storage shelves, kitchen, bathroom, lighting and a porch. It can be utilized for a wide range of uses, including a bedroom, garden house, office, or for the more adventurous ones amongst us, a portable house.

User specific aspects	
User groups:	workers
Physical properties	
Plot area:	20 m²
Construction type:	Pre-fabricated building
Foundation type:	Foundation block that acts as a counterweight
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	plastic and metal

No. of buildings:	1
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Built area:	20 m²
Implementation data	
Designer:	dmvA
Executing company:	AD&S Thomas Dentruck

82. BALE HOUSE

Main source:

http://www.modcell.com/projects/balehaus-at-bath/

Image 195: Modcell

Image 196: https://blog.is-arquitectura.es/2009/12/04/balehaus-casa-con-paneles-prefabricados-de-paja/

Project description:

Energy and space efficient, the walls of this house are made from straw bales which makes them mould resistant, warm and strong. Funnily enough, leftover materials from construction are sent to farms, to be used for animals.

Particularities of the Project:

The construction programme commenced on the 16th of June 2009 and was completed in September 2009. The research will concentrate on a number of key area's including:

- Thermal performance
- Acoustics
- Air tightness
- Relative Humidity

The building has been fitted with the latest testing technologies to monitor all aspects of the buildings performance. At the end of the project the building will be dismantled and relocated to another site.

User specific aspects	
User groups:	Families
Location and environment	
Location:	University of Bath

Surrounding environment:	Urban environment
Climate:	Temperate
Physical properties	
Foundation type:	Prefabricated building
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood, curtain walls
No. of residential units:	1
Storey count:	2
No. of persons per unit:	4
Implementation data	
Executing company:	AD&S Thomas Dentruck

83. ARC HOUSE

Main source:

http://bellomoarchitects.com/projects.html#modular

Image 197: https://www.designswan.com/archives/house-arc-modular-portable-home.html

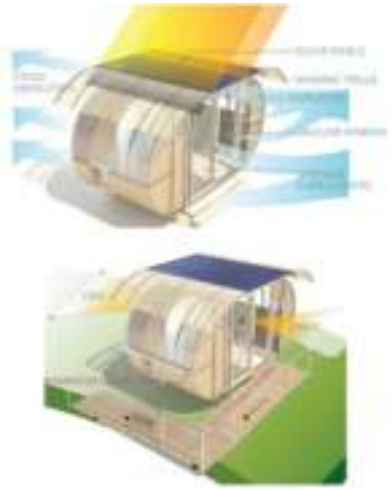


Image 198: https://www.designswan.com/archives/house-arc-modular-portable-home.html

Project description:

Californian architects have designed this completely sustainable green prefab. This prefab curved house was delivered flat packed in a box that measures 4 feet x 10 feet x 3 feet and was installed in three days by three people. The house has solar panels which means this cabin can, to a certain degree operate off the electricity grid.

Particularities of the Project:

The PUE is self-sufficient. Represents a new model for compact living. Born from a modular system of bent steel tubes, the House Arc was created as an environmentally sensitive and affordable method of housing people in a beautiful, functional, and adaptive way.

User specific aspects	
User groups:	locals
Location and environment	
Location:	Big Island, Hawaii
Climate:	Tropical

Physical properties	
Construction type:	Prefabricated building
Foundation type:	Concrete basement put on the floor (without digging)
Building type:	house (1-2 units per building)
Weather resistance:	Resistance to high temperatures
Connection to neighboring buildings:	detached (free standing)
Materials used:	Wood, plastic, glass
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Utilities	
Water supply:	Rainwater collection and treatment
Sanitation system:	Water treatment
Electricity:	Solar panels
HVAC:	Shading trellis and cross ventilation
Solid waste management:	
Implementation data	
Designer:	Bellomo architects
Executing company:	Bellomo architects
Comments & references	
Additional references:	https://www.designboom.com/architecture/bellomo-architects-house-arc/

84. VIVIHOUSE

Main source:

http://www.strawbuilding.eu/wp-content/uploads/2018/01/Vivihouse_Zwischenstand.pdf

Image 199: http://www.vivihouse.cc/was-ist-vivihouse/

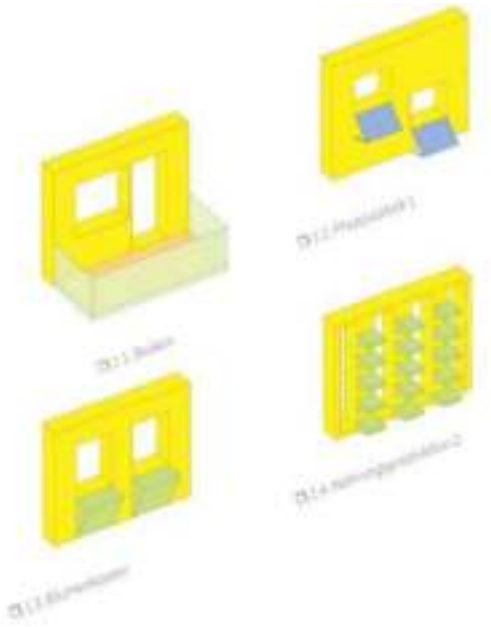


Image 200: Façade elements, ICP and TU 2017, p.10

Project description:

vivihouse is the first open-access DIY multi-storey timber building - designed as an architecture, that addresses social and ecological challenges.

vivihouse is suitable for all, who love living and working in a healthy, responsibly built environment and are concerned with low prices. The creative freedom of this construction concept allows integrating one's own talent, and commitment and dedication, being involved in the DIY construction and adapting to one's individual and collective needs.

The aim is reaching resilience and sustainability by focussing on highest flexibility, longevity, reversibility, design possibilities and construction site safety in the field of DIY-construction. ICP and TU (2017, p.6).

Particularities of the Project:

It is not primarily designed to be a temporary house, but possible to dismantle, transportability and potential for new configuration are mentioned as advantage points in ICP and TU (2017, p.4).

The example has a high innovation / experimental aspect, as it is a multistorey, self-built, environmentally friendly house, which tries to integrate users and their needs in design, installation, and implementation.

Inclusion at construction ("inklusion am Bau") is centrepiece of the project's philosophy. This means:

For all, from all:

- uncomplicated, save construction processes
- affordability (aiming for cost range of subsidised housing)
- interaction and mutual assistance through workshops and online platform

for future generations:

- high energy efficiency, long lifetime
- Use of renewable resources, closing of resource cycles (if possible), waste prevention
- demountability, transportability and potential for new configuration
- easy adaptability, continuation of further development (Weiterentwickelbarkeit)

Location-independent, open for various applications, flexible

- low requirements to workshop
- usable for urban and rural area for 1-6 floor buildings
- freedom to a great extent in layouting the floorplan and facade
- potential for mixed use: office, living, social infrastructure

User specific aspects	
User groups:	private customers, who are willing to participate also in the construction process
Drivers/triggers:	The smart society involves the requirements of all. People become more engaged in shaping the living spaces in order to develop life visions apart from societal routines and norms. City of Vienna is aiming for including more people in the urban development; thus inclusion becomes more and more to one of the guiding principles.
Social mix & cohesion:	Project still in project phase. Thus, no information on social mix and social cohesion available. In ICP and TU (2017, p.4), the potential for mixed use (office, living, social infrastructure) is mentioned.
Gender-sensitive aspects:	not specified. Assumption: none.
Location and environment	
Location:	not yet available (project in pilot phase). Project is developed at TU Vienna. Additional information 16.4.2019: Prototype has been built in Pernitz, Lower Austria

Surrounding environment:	both urban and rural (ICP and TU 2017, p.8)
Type of setting:	Unknown. It is part of a research project and currently in its pilot phase. Later on it is supposedly embedded in formal setting
Climate:	Temperate
Physical properties	
Construction type:	modular DIY system. Structurally supporting skeleton building (timber frame building), which is completed by panel elements. 3 main construction phases: First, prefabrication of wall frames, facade elements, etc. Second, assembly of elements on building location. 3rd, interior constructions
Building type:	building (more than 2 units per building
Weather resistance:	Not specified. One design decision was not to integrate the load bearing pillars into the facade in order to avoid sources of error an leakages at the facade.
Materials used:	renewable raw materials: Timber wall frames, insulation material: straw bales which would otherwise go to waste (Source: https://thegap.at/ein-guter-rahmen-fuer-neues/) Mainly renewable materials: timber, straw, loam. Staircase can also be of reinforced concrete (ICP and TU 2017, p.8).
Storey count:	up to 6 storeys (modular designs possible); optimised for 4 storeys
Integration of recreational and/or productive opportunities:	Facade elements can be potentially equipped with either a balcony, flower boxes or gardening boxes. (ICP and TU 2017, p.10, see Image 203: Façade elements, ICP and TU 2017, p.10)
Utilities	
Water supply:	Assumption: Connected to centralised water supply
Sanitation system:	Assumption: connected to centralised sewer system
Electricity:	The facade elements can potentially be equipped with photovoltaic cells. (ICP and TU 2017, p.10).

HVAC:	Insulation material: straw bales HVAC system: water-bearing, activated wall surfaces, decentralised ventilation U-value of facade elements: 0,13W/m²K
Solid waste management:	Assumption: Connected to centralised solid waste management system
Implementation data	
Implemented?	prototype status (in fall 2018 and summer 2019 the prototype will be shown at different locations in Austria)
Year of construction:	
Designer:	Unknown. Vivihouse is a project at TU Wien under the lead of Initiative of Covivial Practices. Nikolaus Kichler is in charge of concept and project development, Mikka Fürst is in charge of implementation and realization. other project team members are: Kathrin Meyer, Paul Adrian, Karin Stieldorf (Source: http://www.vivihouse.cc/kontakt/)
Executing company:	vivihouse is designed to be assembled by its future residents on their own
PUE-related patents:	Not specified. Assumption: None, as open-access, open-data is a relevant factor in this project.
Life cycle aspects	
Reversibility:	It is designed for enabling disassembly and transport (ICP and TU 2017, p.8). In order to prevent the facade elements of being too large and thus being dependent on oversize load logistics for road transportation, a separate spacer between wall modules was developed.
Use of reused/recycled materials during construction:	Straw bales which would otherwise go to waste are used as insulation material
Adaptability:	Due to the modularity of its elements, vivihouse can be assembled in different building configurations and orientations. High adaptability: The modular basic structure offers many opportunities for urban planning design, floor plan and facade layout as well as rebuilding, refurbishing and refining. (ICP and TU 2017, p.8). In axis distances of 2,75 m, the building is extendable in a modular way on its long site (ICP and TU 2017, p. 14)

Innovation aspects:	yes, new way of construction, DIYconstruction of multi-storey houses. Vivihouse aims for connecting people and activating them from being passive consumers, who want to try out, achieve and popularize collectively ecological construction methods for multi-storey living. New dynamics of Fablabs, makers, planners, material suppliers, logisticians are to be established Key outcome of the project is a toolkit for urban do-it yourself construction. ”Our motivations, following the principles of salutogenesis, resilience and mutuality, are less about creating ”finished” products, rather than recognizing open social design processes as the essential core in built environments.” Currently, inhabitants often lack opportunities for identification, taking responsibility or developing care & repair urbanism in the buildings they live in. However, how to organise the spacial aspects of future-oriented living together is a key question in building culture (Baukultur). Thus, emphasising social processes and open approaches is key in maintaining creative, living and meaningful spaces that are and culturally and ecologically intact. Therefore, planning of conditions for self organising social processes is needed. (ICP and TU (2017, p.5). High DIY-potential: around 2/3 of usual amount of work (construction) can be done in DIY (mainly facades, ceilings, apartment partition walls, internal walls). Skilled workers are focussing on foundations, beams, junctions, staircases, transportation and assembly. (ICP and TU 2017, p.8).
Comments & references	
Additional comments:	research project at TU Wien, still in pilot phase. The first building elements are constructed in summer 2018 in university courses and local fablabs. An initial pre-prototype was presented at Makerfair in Vienna (May 2018). Starting in fall, the transportable prototype will make a "Tour de Austria", stopping in Linz, Innsbruck, Graz and Vienna. At each location, the prototype will be expanded as new building elements will be attached. After this tour, there will be an evaluation of the Do it yourself construction process, of the social processes, the de-centralised manufacturability, wear and tear, the transportability and the requirements to workshops. (ICP and TU 2017, p.4) The design concept is based on the urban planning requirements of the City of Vienna, which aim to achieve a mixed-use city as far as possible (both in the dense block areas as well as in the more dispersed neighborhoods). The principle of mixed use is reflected in the vertical layering of different space use types. With the aim of ensuring increased usability of the space in the long term, the lower three floors

	are equipped with increased ceiling heights. The ceiling height on the ground floor is 4m (office/retail/social infrastructure). On the 1st floor and 2nd floor it is 2.80m in order to accommodate residential, office, or other social infrastructure as desired. (Questions remain about the suitability of the ventilation system for the various purposes). On the floors above, which are purely residential floors, the ceiling height is 2.6m (2.8m). The resulting floor area ratio of residential floor area to non-residential floor area is 1:1-5:1 and is based on the City of Vienna's distribution ratio of 4:1 (residential vs. all other uses)
Additional references:	Project toolkit: Fürst, M., Kichler, N. and Schulz, P. (Hg.) 2017: Ein Toolkit für urbanen Selbstbau - gemeinsam mehrgeschoßig und ökologisch bauen. http://www.vivihouse.cc/toolkit/ ICP and TU Wien (2017): Vivihouse.cc - Das erste mehrgeschossige ökologische Selbstbausystem. Available at: http://www.strawbuilding.eu/wp-content/uploads/2018/01/Vivihouse_Zwischenstand.pdf http://www.vivihouse.cc/ https://thegap.at/ein-guter-rahmen-fuer-neues/

85. 3D HOUSING 05

Main source:

http://www.3dhousing05.com/

Image 201: Massimiliano Locatelli | CLS Architetti

Image 202: Massimiliano Locatelli | CLS Architetti

Project description:

Project for a house of 100 square meters, 3d printed on site, at Piazza Cesare Beccaria. A research project on the possibilities offered by 3d printing in the field of sustainable architecture, responding to the increasingly urgent revolution in the world of housing. 3D HOUSING 05 is a house designed with a new architectural language developed thanks to a revolutionary technology.

The concrete composite - the basic construction material - is juxtaposed with equally strong and timeless materials: the brass of the window frames, the marble of the bath fixtures, the smoothed plaster as one of the possible wall finishes, the sheets of polished brass for a reinterpreted industrial kitchen. The stratification of the concrete generates a pattern, a surface on which climbing plants can grow spontaneously, reaching the roof which becomes an urban garden.

Particularities of the Project:

It is a house of about 100 square meters, with living area, sleeping area, kitchen, bathroom, which will be built over two / three weeks with a 3D printer. The house will be sustainable, can be demolished or moved as desired, expanded and having the possibility to build it in a short time, it will cost less than a traditional house.

User specific aspects	
User groups:	locals

Location and environment	
Location:	Piazza Cesare Beccaria, Milan, Italy 45.4642, 9.1952 [Show on map]
Surrounding environment:	Urban environment
Climate:	Temperate
Physical properties	
Plot area:	100 m²
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Weather resistance:	
Equipment & facilities:	3D HOUSING 05 is composed of a living area, a bedroom area, a kitchen, a bathroom and a terrace roof.
Connection to neighboring buildings:	detached (free standing)
Materials used:	Concrete composite applied by 3d printer
No. of residential units:	1
Storey count:	1
No. of persons per unit:	5-6
Built area:	100 m²
Implementation data	
Year of construction:	2018
Designer:	Massimiliano Locatelli, CLS Architetti
Executing company:	Massimiliano Locatelli, CLS Architetti
Construction time:	1 week

Life cycle aspects	
Reversibility:	The house can be mounted/dismounted and put in other contexts.
Adaptability:	The house can be realized in different dimensions, depending on family size.
Innovation aspects:	3D-printed on site

86. BIGDELTA PROJECT

Main source:

http://www.wasproject.it/w/stampa-3d/bigdeltawasp-12m/

Image 203: WASP

Project description:

A clay house might not seem innovative, but thanks to the 3D technology it is possible to realize very attractive constructions in a short time and with a necessity of manpower practically equal to zero. The WASP project is not just about the house but about the whole process; for this reason, it is necessary that the development of the machine is perfectly in line with the starting idea: a printer that extrudes material at km 0 and feeds itself of sun, wind and water, which is adaptable to any type of environmental context, transportable and easily assembled.

Particularities of the Project:

Materials at km 0: PUE can be built everywhere with few costs.

User specific aspects	
User groups:	homeless, poor people
Location and environment	
Location:	Italy
Surrounding environment:	Rural environment

Climate:	Continental
Physical properties	
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Although the extrudable materials are multiple, the extruder has been designed to work with dough containing long fibers. The reason for this choice is the heart of the project: from the beginning our desire was to extrude earth and straw. Therefore, it is not necessary to chop the fiber, which, paradoxically, works best when it is long. There are two types of roads that can be used: raw materials of natural origin and specific technical materials can be used. As for the raw earth, these can be lightened with vermiculite or other natural light materials. Synthetic or technical doughs can instead be made of cementitious or lime-based materials, joined, for example, to blown glass or expanded clay. Excellent results have also been achieved by inserting polystyrene into the cement. This solution makes the dough considerably light while reducing costs, but we have not done an analysis of what it involves in terms of environmental impact.
Storey count:	1
Implementation data	
Year of construction:	2016
Designer:	WASP
Executing company:	WASP
Construction time:	1 week
Funding:	
Plot ownership:	
PUE-related patents:	
Life cycle aspects	

Use of reused/recycled materials during construction:	mixtures based on clay or lime enriched by hemp or canapulo, or, again, blown materials - a very funny application where you insert popcorn inside the dough to generate air bubbles.
Comments & references	
Additional comments:	270 cm of clay and straw walls with a diameter of 5 meters were printed, using about 40 tons of material. The total layers are 135, with an average weight of 300 kilos each, average time to create a 20-minute layer. As for consumption, we are talking about 2 cubic meters of water and 200 kWh. And we come to the costs: 32 euros for energy, 3 euros for water, 10 euros for straw, 3 euros for petrol: total 48 euros. Do you want to save further? By mixing with the feet instead of the machine, energy costs are reduced by 90%.

Image 204: WASP

Image 205: WASP

87. 3D PRINTED HOME

Main source:

http://www.archilovers.com/stories/26625/are-3d-printing-homes-the-answer-to-the-housing-crisis.html

Image 206: Icon & New Story

Image 207: Icon & New Story

Project description:

new housing solution, efficient and economic born to give an answer to the typical housing emergency of very poor.

Particularities of the Project:

The Austin-based startup ICON has presented a possible solution to homelessness at SXSW, involving cost-effective, 3D-printed homes. The startup has developed a method where a single-story 650-square-foot cement house can be printed in only 12 to 24 hours. This is a fraction of a time it takes for new construction and could lead to more homes being built in less time for the people worldwide without adequate shelter.

User specific aspects	
User groups:	homeless
Location and environment	
Location:	New York
Surrounding environment:	Urban environment
Climate:	Temperate

Physical properties	
Plot area:	55-75 m²
Construction type:	Prefabricated building
Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
No. of residential units:	1
Storey count:	1
Implementation data	
Year of construction:	2015
Designer:	Icon & New Story
Executing company:	Icon & New Story
Construction time:	1 day

88. WEAVING A HOME

Main source:

http://www.abeerseikaly.com/weavinghome.php

Image 208: Abeer Seikaly

Project description:

Only conceptual, but proven to work.

“The system is informed by the latest technological advances of fabric innovation, materials, and assembly to fabricate a new kind of technical weave that is easy to erect, dismantle, reuse and scale into various functions from basket to building skin to tent. As every fabric is composed of individual threads, the conceptual crux of this project revolved around considering the structure as nothing more than individual threads of a cloth. The goal was not to create a homogenous system, but to combine structure and fabric in a way that allowed the composite to perform in syncopation. The results of this study are described as follows: The system is composed of durable formed plastic members threaded into a cloth in a predetermined pattern to form a singular ‘unit’. The unit itself is flexible as it folds across its central axis. The degree to which the unit can fold relies as much on the plastic members as it does on the elasticity of the fabric (the type of fabric would inevitable be one that has both durability and flexibility, and can serve several functions. Spandex blend for the general structure and solar absorbing fabrics serve the function of this project. When multiplied, the geometry and the materiality of the unit work to create a system that performs similarly to fabric. It can bend on both axis and thus take on a variety of forms, yet maintain a distinct and recognizable presence and structural integrity. The habitable potentials of this system are many. Because the structural members are conceived to be hollow, necessities such as water and electricity can run through the structure much like they would run through a typical stud wall. Exposure and closure to the elements could be controlled simply by manipulating

the individual units. Scale and division could be ultimately explored and addressed further." (Source: https://www.designboom.com/project/weaving-a-home/)

"The concept behind the structural fabric is the timeless tradition of weaving members into lightweight forms that easily collapse into flat surfaces for transport. The various threads of the weave accommodate different purposes, for example: mesh for windows and storage, a stretchable solar fabric for sustainable energy, which feeds flexible pipes for water, heat, and electricity." (Sources: http://aasarchitecture.com/2016/11/weaving-home-abeer-seikaly.html)

"Design is supposed to give form to a gap in people's needs. This lightweight, mobile, structural fabric could potentially close the gap between need and desire as people metaphorically weave their lives back together, physically weaving their built environment into a place both new and familiar, transient and rooted, private and connected. In this space, the refugees find a place to pause from their turbulent worlds, a place to weave the tapestry of their new lives. They weave their shelter into home." (Source: http://www.abeerseikaly.com/weavinghome.php)

Particularities of the Project:

- mobile & reusable
- various functions (from basket to building skin to tent)
- idea of structure being nothing more than individual threads of a cloth
- solar absorbing fabrics for sustainable energy feeding flexible pipes for water, heat and electricity
- water & electricity can run through hollow structure
- inspired by nomadic tribes (Bedouin)
- conceptual artwork shows the tents as being weather resistant (desert setting & snow)

User specific aspects	
User groups:	refugees; nomads
Drivers/triggers:	disasters & political unrest leading to refugees
Social mix & cohesion:	No experience in this area. The description addresses need for shelters to help rebuild social interaction. Described as "a place both new and familiar, transient and rooted, private and connected."
Location and environment	
Location:	Jordan
Surrounding environment:	Rural environment
Type of setting:	Seeing as it is a proposal for disaster shelter for refugees: formal.

Climate:	Dry (desert / semi-arid)
Physical properties	
Plot area:	no plots, only units
Construction type:	Tent
Foundation type:	None
Weather resistance:	not specified. Image s depict open structures for spring and summer in an arid area and closed structures for autumn & winter (with snow). BUT: it has been noted to seem lightweight and therefore resistance to wind is questionable.
Equipment & facilities:	water storage system functions as a shower.
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ durable formed plastic members threaded into a cloth ○ Spandex blend for the general structure and solar absorbing fabrics ○ flexible pipes for water, heat, and electricity
No. of buildings:	one unit to conceivably a ”settlement”.
Storey count:	1
No. of persons per unit:	not specified.: small family at max.
Built area:	not specified. Approximated radius of 3-4m; that would result in 28-50 m²
Utilities	
Water supply:	not connected to centralised water supply system. Water can run through hollow structures of the tent and be heated.
Sanitation system:	Water rises through thermosiphoning and is stored in a water storage tank.
Electricity:	available battery electricity can be wired through hollow structures
HVAC:	solar energy

Solid waste management:	not specified. Does not appear to be available.
Implementation data	
Implemented?	No. “There is no proof of any structural successes of this concept because there are no prototypes. This structure will likely not be successful because it can easily collapse inwards and has no connection to the ground. The structure also seems to be lightweight because of the canvas materials, so it will blow over in large wind forces if it is not secured to the ground” (Source: https://scholarcommons.scu.edu/)
Designer:	Abeer Seikaly
Life cycle aspects	
Reversibility:	Yes. Concept for foldable mobile transportable housing units.
Planned reuse/recycling:	Yes, planned reuse of housing unit.
Adaptability:	high adaptability. folding allows various functions (from basket to building skin to tent)
Comments & references	
Additional references:	http://www.abeerseikaly.com/weavinghome.php https://www.designboom.com/project/weaving-a-home/

89. EXO EMERGENCY SHELTERS

Main source:

https://scholarcommons.scu.edu/cgi/viewcontent.cgi?article=1055&context=ceng_senior

Image 209: reactioninc.com

Image 210: https://inhabitat.com/help-reaction-housing-send-stackable-exo-emergency-shelters-to-refugees-in-syria/

Project description:

“Born from the aftermath of Katrina, the ExoShelter is meant for use in an emergency but versatile enough to handle everything from festivals to long-term camping. The sleek design separates into two pieces — a floor and an upper shell, both of which weigh less than 400 lbs (approx. 180 kg) each and can be moved by hand — and is stackable, making it easy to transport to the setup location. Inside, there’s space enough for four people with beds that fold out of the walls, four wall outlets for charging gadgets, LED lighting, and climate control. Entry is handled via NFC, and the LED display above the door makes sure you don’t try wandering into someone else’s pod.”

Particularities of the Project:

- stackable (see Image 213)
- modular
- personalized digital security
- setup in minutes by 4 people without equipment
- access to a power source & 4 wall outlets
- built in LED lighting
- designed easy to clean
- multiple EXOs can run off a generator truck, portable solar panels or be hooked into a power grid
- version with built-in air conditioner and louvered vents is in the works
- a wet unit containing running water is in the works
- consists of Tegris (an aluminium composite material, recyclable)
- climate controlled interior

User specific aspects	
User groups:	refugees; festivals; long-term camping
Drivers/triggers:	lack of adequate housing after Hurricane Katrina
Gender-sensitive aspects:	“a digitally-coded door provides security. This is particularly important for women and children.” (Source: Greenprophet)
User experience:	Prototype experience report
Location and environment	
Type of setting:	concept for emergency shelter: formal
Physical properties	
Site type:	
Plot area:	7,5 m²
Construction type:	Prefabricated
Foundation type:	no foundation. The floor can be filled with 1000 lbs (approx. 450 kg) of water to secure it to the ground. (Source: scholarcommons.scu.edu)
Weather resistance:	Assumption: the unit appears quite weather resistant (Tegris material is extremely durable)
Equipment & facilities:	technically possible to add refrigerator if bunk beds are mounted on wall. Bathroom is not included in unit. “Wet unit” with running water is in development.
Connection to neighboring buildings:	detached (free standing)
Materials used:	○ Tegris (durable aircraft-grade aluminium composite material with similar properties to carbon fibre but recyclable and cheaper, lightweight and durable) (walls) ○ birch (hollow bottom) ○ steel (hollow bottom)
No. of buildings:	spans from single unit to refugee camp (5.000 people)

Storey count:	1
No. of persons per unit:	4
Built area:	7,5 m²
Area per person:	1,8 m²
Integration of recreational and/or productive opportunities:	Not explicitly in design. (Maybe use of electronics through integration of outlets?)
Utilities	
Water supply:	not connected to centralised water supply system
Sanitation system:	not included in unit.
Electricity:	can run off a generator truck, portable solar panels or be hooked into a power grid and possesses 4 outlets
HVAC:	○ heater system ○ integrated ventilation fans ○ one source mentions working on prototypes with a climatisation system.
Solid waste management:	not included in concept
Implementation data	
Implemented?	Yes, prototypes. Not in large-scale projects as far as I can tell (but plans were made for Syria in 2014 ... I could not find data on what happened with this. But many funds were raised, perhaps deeper research should be done)
Designer:	Design: Frog Development: Reaction Housing
Client:	The planned real world testing for refugees in Syria collected funding through a public crowdsourcing site (Indiegogo)
Cost of construction:	“The shelters are stackable so they can be easily transported in large quantities. They are also extremely lightweight, at 400 pounds each, and can be set up easily in minutes by four people

	without any equipment. Because of the stackability and lightweight materials, the shelters can be quickly deployed in disaster situations”
Funding:	prototype-development: costs presumably covered by developers ”Reaction Housing”? real-world testing on larger scale: crowdfunding
Construction time:	“Each shelter costs approximately $5,000. For a refugee camp housing 5000 people, the overall cost would be approximately $6,250,000 because each shelter can house four people”
PUE-related patents:	not specified
Life cycle aspects	
Expected total life time:	max. 10 years
Reversibility:	reversible (no foundation)
Potential/planned secondary use concepts for TH-units:	long-term camping
Use of reused/recycled materials during construction:	Assumption: none
Adaptability:	○ High adaptability. ○ Units can connect through doorways (combo of units to form rooms with different purposes)
Innovation aspects:	Results of the Exo testing in Syria will inform modifications and improvements to the design and make them even better equipped to help families in need after disasters, emergencies or conflicts.”
Comments & references	
Additional references:	https://www.greenprophet.com/2014/03/reusable-stackable-exo-emergency-shelters-for-syrians-in-need/ https://scholarcommons.scu.edu/ https://uncrate.com/exo-shelter/ https://www.popularmechanics.com/technology/a14357/exo-shelters/ https://ida.mtholyoke.edu/bitstream/handle/10166/4082/Copyright

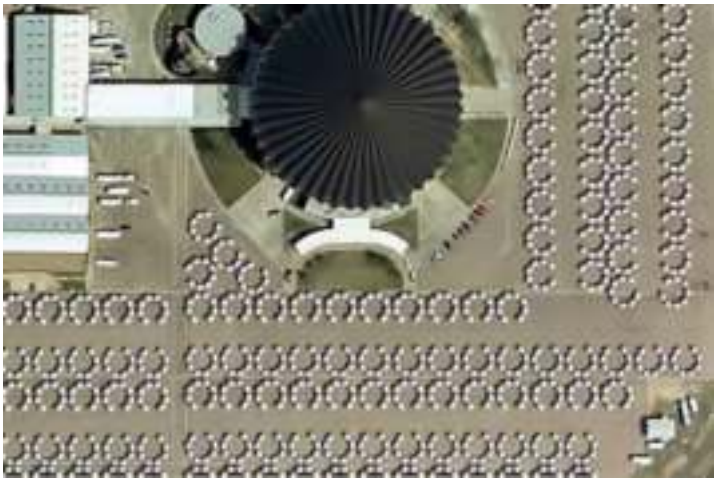


Image 211: https://inhabitat.com/help-reaction-housing-send-stackable-exo-emergency-shelters-to-refugees-in-syria/reaction-housing-system-indiegogo-campaign-5/

90. INSTANT HOMES

Main source:

https://www.tu-darmstadt.de/vorbeischauen/aktuell/archiv_2/2014/einzelansicht_107968.de.jsp

Image 212: https://www.planet-wissen.de/technik/werkstoffe/papier/papier-instant-home-100.html

Project description:

Instant Homes are the outcome of an interdisciplinary research project (chemistry, architecture, mechanical engineering) at TU Darmstadt, aiming for developing a foldable paper emergency accommodation that is stable, resistant to weather, easy to assemble and nice to live in. A prototype was developed. The basic idea is helping people at local level in case of an emergency in a quick way with a straightforward solution made from biodegradable materials.

Particularities of the Project:

The material used is quite uncommon for emergency shelter. Paper is coated with wax (and chemicals?) to make it waterproof, while still being lightweight.

User specific aspects	
User groups:	people affected by disasters, refugees
Drivers/triggers:	quick response for emergency situations
Location and environment	

Location:	Prototype status only. Was developed at TU Darmstadt, Germany
Surrounding environment:	Might be suitable for both, urban and rural surroundings.
Type of setting:	mainly formal. Research project with prototype development
Climate:	Temperate
Physical properties	
Plot area:	Assumption: approximately 10 m²
Construction type:	prefabricated. Flatpack delivery due to paper folding design.
Foundation type:	Not specified. In pictures of the prototypes it looks like there is no foundation whatsoever.
Building type:	“Instant homes” is more a room than a house (also, because there is no infrastructure included)
Weather resistance:	Instant homes are resistant to rain (due to wax coating of paper). They are not suited for cold weather, as they do not provide sufficient insulation (Source: 20min)
Equipment & facilities:	Paper furniture is integrated in the design and folds up when the instant home is erected (Furniture provide some extra stability to the instant home: bed, bench, shelf) (Source: massivkreativ) No kitchen facilities, toilet, shower in prototype.
Connection to neighboring buildings:	detached (free standing)
Materials used:	Coated paper (for water resistance). Walls are using honeycomb structures for high stability in relation to low material use. Additional research on coating for fire resistance and mould-resistance were part of project.
No. of buildings:	Prototype only. Modular assembly would be possible
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Area per person:	Assumption: approximately 10 m²

Integration of recreational and/or productive opportunities:	None
Utilities	
Water supply:	In this prototype, there is no integrated water supply solution and would need more research (Source: 20min)
Sanitation system:	In this prototype, there is no integrated sanitation solution and would need more research (Source: 20min)
Electricity:	Not specified. Assumption: none
HVAC:	Not specified. Assumption: none. Instant homes are not resistant to cold weather. There are no glass windows. If users want to be for themselves, they have to shut the door and windows completely (comparable to window shutters) (Source: 20min)
Solid waste management:	Not specified. Depends on existing local waste management system.
Implementation data	
Implemented?	
Year of construction:	
Designer:	Heads of research team: Ariel Auslender (Architecture), Markus Biesalski (Chemistry), Samuel Schnabel (Mechanical Engineering)
Executing company:	Prototype developed and built at TU Darmstadt
Cost of construction:	approx. 2000€ per unit (Source: massivkreativ)
Funding:	research funding
PUE-related patents:	Unknown. Assumption: Could apply for coating of paper or folding technique?)
Life cycle aspects	
Expected time of PUE on-site:	About 1 year (Source: massivkreativ)

Reversibility:	Reversibility due to no foundation. Biodegradability makes the whole unit reversible.
Planned reuse/recycling:	After one year of use, instant home are supposed to be composted (Source: massivkreativ)
Potential/planned secondary use concepts for TH-units:	Not specified. Since it is supposed to be composted, there won't be secondary use concepts.
Use of reused/recycled materials during construction:	Not specified. Used paper/cardboard materials may come from secondary sources.
Adaptability:	The interior of the instant home is predetermined due to the built-in furniture. There are however design ideas for modular assembly in clusters or plots.
Innovation aspects:	Using paper for shelter building is quite innovative in terms of material use.
Comments & references	
Additional references:	http://www.massivkreativ.de/ https://www.planet-wissen.de/ http://www.20min.ch/wissen/news/story/27455265 https://www.tu-darmstadt.de/

Image 213: Poster by F. Luttropp, http://www.fif.tu-darmstadt.de/media/fif_forum_interdisziplinaere_forschung/_fif_temp/fif_media_furtherance/fif_media_funded_projects/2012_8/plakate_2012_fif/151115_INSTANT_HOME_PLAKAT_lu.pdf

INTERNATIONAL TEMPORARY HOUSING EXAMPLES – GROUP D

The following examples are permanent housing solutions with important learning effects for temporary forms of housing, or temporary (pre-)use that has taken place.

91. EMPOWER SHACK

Main source:

http://u-tt.com/project/empower-shack/

Image 214: Empower Shack 2.0. Image courtesy of UTT

Project description:

“The project aims to reshape the approach to informal settlement upgrading by offering an innovative and inclusive methodology for the fair distribution of public space, delivery of basic services, and an urbanization scheme that combines housing upgrades with a safer urban environment and new economic and social possibilities.”

Particularities of the Project:

“This pilot project seeks to create considered settlement upgrading strategies through collaboration with residents, professionals and the government. This not only includes the physical upgrading of dwellings, but also spatial planning (addressing issues of fire, mobility and public space) ecological landscape management and financing programs for residents.”

User specific aspects	
User groups:	poor residents of Cape Town
Drivers/triggers:	a housing crisis
Location and environment	
Location:	Khayelitsha, Cape Town, South Africa -34.0403 18.6778 [Show on map]
Sea level:	0 m
Surrounding environment:	Urban environment

Physical properties	
Plot area:	public 2082 m², private 1949 m²
Construction type:	Solid
Building type:	Solid
Foundation type:	house (1-2 units per building)
Weather resistance:	good
Equipment & facilities:	standard equipment
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	Bricks
No. of buildings:	Prototype in 2014: 4 houses. 2017: an entire BT-Section (ca. 59 houses)
Storey count:	1-3
Built area:	42 m² - 85 m²
Utilities	
Water supply:	Connected to grid
Sanitation system:	Not specified
Electricity:	Connected to grid
HVAC:	Not specified
Solid waste management:	Not specified
Implementation data	
Implemented?	Yes
Year of construction:	2013-2017

Designer:	Clara Bitter, Fernande Bodo, Axel Chevrolet, Maria Deluren, Khensani de Klerk, Michele de Viliers, Emma Flores, Andrea Johnson, Marcin Kurdziel, Scott Lloyd, Svenya, Schärfer, Irfan Safdag, Giulia Tigliè, Gregiore Farquet, Danny Wills
Client:	BT Section Site C Development Committee, City of Cape Town
Executing company:	The Swiss Re Foundation
Funding:	The Swiss Re Foundation
Plot ownership:	private
Life cycle aspects	
Reversibility:	No
Planned reuse/recycling:	No
Comments & references	
Additional references:	http://u-tt.com/project/empower-shack/

92. UPGRADE OF COLLECTIVE CENTRES IN BAKU, AZERBAIJAN

Main source:

http://shelterprojects.org/shelterprojects-compilations/Shelter-Projects-EUROPE%20Booklet-2017.pdf

Image 215: NRC Azerbaijan

Project description:

After the Nagorno-Karabakh conflict between Azerbaijan and Armenia (early 1990s), 500.000 people became IDPs (internally displaced people), around half of which moved to urban areas (most of them to Baku). Many people moved into dilapidated, overpopulated public buildings, most of which were originally student residence halls and dormitories. This temporary shelter solution lasted longer than was expected. The public buildings were in very poor condition and had further deteriorated with the long-term displacements. A project was launched to upgrade and maintain public buildings occupied by IDPs. Overpopulation, lack of sense of ownership and high resident turnover reduced the overall durability of both repair and community activism.

Particularities of the Project:

This is an example of a temporary housing solution which lasted longer than expected. Existing buildings were repurposed for IDPs to live in. However, those buildings were in very poor condition and did not satisfy basic human needs. A programme to upgrade the public buildings and improve quality of living was adopted, with the main criteria for the selection in the programme being: at least 70% of building inhabitants had to be IDPs, other organisations could not have previously worked in the building, building had to be in exceptionally bad condition, inhabitants had to be willing to volunteer to help with repairs, cleaning and maintenance. The involvement of community members in the work was seen as a key to the successful implementation of the project.

User specific aspects	
User groups:	IDPs fleeing from Nagorno-Karabakh conflict between Azerbaijan and Armenia in the early 1990. 700.000 people displaced in total: 200.000 refugees, 500.000 IDPs, approx. 170.000 IDPs coming to Baku in 1992-1993. Project target group: 27500 people in over 60 buildings over 8 years. Mean family size: approx. 4-5 persons.
Drivers/triggers:	armed conflict leading to IDPs.
Social mix & cohesion:	not specified. Assumptions: Mainly IDPs. Overcrowding in buildings might have caused frictions. No information given on relationship of PUE and neighbourhoods. With 60+ buildings dispersed across Baku, this might vary from case to case.
Location and environment	
Location:	More than 60 public buildings all across Baku. No specific address stated.
Surrounding environment:	Urban environment
Type of setting:	(mainly) formal
Climate:	Temperate
Sea level:	ca. -28 m (Baku)
Physical properties	
Site type:	developed site. Might vary from case to case
Plot area:	not specified and varies from case to case
Construction type:	Might vary from case to case. Assumption: load-bearing walls
Foundation type:	not specified and might vary from case to case.
Building type:	building (more than 2 units per building)
Equipment & facilities:	shared kitchen, bathroom, toilets, washing rooms, corridors. In some cases the buildings were without water supply or sanitation (or broken sewerage, leaking roof and dampness)

Connection to neighboring buildings:	varies from case to case
Materials used:	bricks, reinforced cement
No. of buildings:	60+ public buildings. (There is not really one centralised pop-up environment, but the different public buildings all over Baku, which were used for temporary housing form their own PUE)
No. of residential units:	varies from case to case. Many residential units per public building.
Storey count:	varies from case to case. Multi-storey buildings (e.g., 6-8 storeys)
No. of persons per unit:	not specified. Assumptions: one family per unit, thus at least 4-5 persons per unit.
Built area:	not specified and varies from case to case
Area per person:	not specified and varies from case to case
Integration of recreational and/or productive opportunities:	not specified and varies from case to case. One location is mentioned where adjacent public houses shared a common yard.
Utilities	
Water supply:	Connected to centralised water supply system. In some cases the buildings were without water supply. Assumption: connection to centralised water supply system was the normal case. No water supply might result from general poor condition of water works in Baku at that time (e.g., due to broken pipes). During the upgrade and renovation of the public buildings used for temporary housing, rehabilitation of water infrastructure took place: e.g., bathrooms, washing rooms, water pipes, sinks, faucets, showers, water heaters, etc.
Sanitation system:	Connected to centralised wastewater system. In some cases the buildings were without sanitation. Assumption: connection to centralised sewer system was the normal case. No sanitation system might result from general poor condition of sewers in Baku at that time (e.g., due to broken pipes). During the upgrade and renovation of the public buildings used for temporary housing, rehabilitation of sanitation infrastructure took place: e.g., bathrooms, washing rooms, toilets, sewerage, sewerage pipes, etc.

Electricity:	Assumption: Connected to centralised grid. During the upgrade and renovation of the public buildings used for temporary housing, rehabilitation and installation of energy infrastructure took place: e.g., light bulbs, circuit breakers, switchboards, electricity transformers, etc.
Implementation data	
Implemented?	Yes. In this temporary housing example no new buildings were designed and constructed, but existing public buildings were repurposed for temporary living.
Year of construction:	might vary from case to case. Assumed project duration: 1998-2006. An average building took two months to rehabilitate.
Client:	not specified. Upgrades and renovation were part of an NGO driven project.
Executing company:	varies from case to case.
Cost of construction:	n/a. No new buildings were constructed for PUE, but existing public buildings were used for temporary living.
Funding:	not specified. Upgrades and renovation were part of an NGO driven project. Financial structure for initial provision of the public buildings is unknown.
Plot ownership:	varies from case to case. Assumption: As public buildings were used for temporary living, maybe they were also on public land.
PUE-related patents:	Assumption: None
Life cycle aspects	
Expected time of PUE on-site:	Existing public buildings' time on site will reach far beyond temporary use as temporary shelter. The temporary shelter solutions lasted longer than was expected. The project closed 13 years after the conflict started.
Expected total life time:	n/a. Varies from case to case. The buildings were often poor to start with and had further deteriorated with the long-term displacements.
Reversibility:	As the building structure is permanent, so is supposedly the foundation structure.

Planned reuse/recycling:	No information given on the “fate” of the public buildings, once the temporary housing phase was over. Many appliances in the rehabilitated buildings had short lifespans because many people used them (e.g., cooking stoves, taps). The most durable output of the project was the provision of electricity systems (incl. transformers and switchboards) and new roofs.
Potential/planned secondary use concepts for TH-units:	During the project, many families moved out of the buildings to an outskirt of Baku. There were reports that IDPs sell their rooms to relatives or friends. Yet some also locked their rooms and kept them as storage space. Assumption: this is most likely a shady conduct, as by doing so, the empty rooms are not allocated to the most vulnerable persons “next in line”
Adaptability:	The buildings were designed with rooms for one person, not for families of five or more. However, families managed to adapt somehow to this poor conditions. The occupancy of individual rooms changed constantly.
Repurpose, reuse, new development of site/building:	More than 60 public (mostly dilapidated) buildings were part of that project and were maintained and upgraded during the project period in order to ensure higher quality of living for the inhabitants. The buildings existed before and after the project, only the use for temporary living was non-permanent. Most of those public houses were originally student residence halls or dormitories, but there was also mentioning of hostels.
Innovation aspects:	Assumption: None
Comments & references	
Additional references:	https://reliefweb.int/

Image 216: NRC Azerbaijan

93. TRANSFER LIVING SPACE, RANKWEIL

Main source:

http://wohnbauselbsthilfe.magix.net/

Image 217: http://wohnbauselbsthilfe.magix.net

Image 218: http://wohnbauselbsthilfe.magix.net

Project description:

2 buildings that contain 11 living units for refugees and locals

Particularities of the Project:

Part of project “Transfer Wohnraum Vorarlberg”: idea is that refugees and locals live together; refugees help constructing and live on 12 m²/person; locals move into ready-made houses with 25 m²/person

User specific aspects	
User groups:	refugees and local families
Drivers/triggers:	high demand for accommodation for refugees
Social mix & cohesion:	mix between local and fled families
Location and environment	
Location:	Hartmanngasse 26, 6830 Rankweil, Austria 47.2770 9.6342 [Show on map]
Surrounding environment:	Rural environment
Type of setting:	Formal

Climate:	Continental
Physical properties	
Site type:	building land
Construction type:	prefabricated (modular system); timber frame panel construction (Holztalfelbauweise)
Building type:	building (more than 2 units per building)
Equipment & facilities:	complete apartments with kitchen and bathroom
Connection to neighboring buildings:	detached (free standing)
Materials used:	wood, among others
No. of buildings:	2
No. of residential units:	11
Storey count:	3
No. of persons per unit:	3-4
Built area:	350 m2 (assumption from looking at the plans) (Source: Wohnbauselbsthilfe)
Area per person:	<25 m²
Integration of recreational and/or productive opportunities:	vegetable gardens that are maintained by the community
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system
Electricity:	connected to local system
Solid waste management:	connected to local system

Implementation data	
Implemented?	Yes
Year of construction:	2017
Designer:	Andreas Postner, Hermann Kaufmann, Konrad Duelli
Client:	Wohnbauselbsthilfe Vorarlberger gemeinn. reg. Gen.m.b.H.
Cost of construction:	1600 EUR/m²
Plot ownership:	private (Wohnbauselbsthilfe Vorarlberger gemeinn. reg. Gen.m.b.H.)
Life cycle aspects	
Potential/planned secondary use concepts for TH-units:	used as social housing (see above)
Repurpose, reuse, new development of site/building:	the apartments will be converted into social housing later-on.
Innovation aspects:	co-living of refugees and locals; refugees help to construct (not sure if it was carried out that way but that was the plan at least)
Comments & references	
Additional comments:	“The Austrian Association of Municipalities represents 70% of the Austrian population in 2089 municipalities. On average, 2850 people live in a municipality. With 2 houses á 15 people we create living space for 30 persons. 30 persons x 2089 communities gives 62.670 persons. That amounts to 70% of the 90.000 refugees in Austria. This would solve the accommodation problem.” (Source: GAT) Zoning plan: Building area (Source: VOGIS)
Additional references:	http://wohnbauselbsthilfe.magix.net/ https://www.stadtentwicklung.berlin.de/ http://www.gat.st/ http://alpenallianz.org http://www.forum-holzbau.com/pdf/10_IHF_2016_Postner.pdf

	https://www.wohnbauselbsthilfe.at/objekt/rankweil-hartmanngasse/ http://alpenallianz.org/de http://vogis.cnv.at/atlas/init.aspx?karte=planung_und_kataster

94. LA CASA POR EL TEJADO

Main source:

http://lacasaporeltejado.eu/

Image 219: La casa por el Tejado

Image 220: La casa por el Tejado

Project description:

Barcelona developers “La Casa por el Tejado” (House on the roof) have created lightweight, prefab apartments that can be craned into place to grow cities up, not out, in a matter of months. “We believe that the growth of a city should start with using up the remaining buildable space in already-existing buildings,” write the developers. Their team spent four years cataloguing the buildable “air rights” in Barcelona. They found hundreds of buildings that could still be built up by one or two floors totalling 800,000 square meters of available apartment space. “In most historical cities, extensions of the old city were developed through sprawling. This meant that the city expanded outward, not upward. In many cases, the projected buildable area of a project was never exhausted and, thus, remains today as potential buildable space right in the city center.” It is a main objective for the company to build the additional storeys on top of existing buildings with minimal disruption and nuisance for the neighbors. The add-on storeys are prefabricated off-site and 1-2 days of mounting and installation is required to finish the project. As is it always also part of the project to improve and renovate the existing building (e.g., in order to provide access to the rooftop with staircase or elevator) the neighbors also benefit from better housing quality.

Particularities of the Project:

not per se a temporary housing example (the additional storeys are supposed to be permanent. However, the ”add-on” to existing buildings makes this example somehow special, as well as the fundamental research that was undertaken before the project started in order to generate an inventory of buildable space above the city (with the objective to avoid sprawling in order to meet increasing housing demand). ”We can continue building the city on top of the city”

User specific aspects	
User groups:	private customers. No specific target group is mentioned.
Drivers/triggers:	city growth. Leading questions: Why do we need to use more space for growing cities? How many m² does the city have for constructing on rooftops?
Location and environment	
Location:	various projects in Barcelona, e.g.: Carrer de Girona, 81, 08009 Barcelona, Spain 41.3954 2.1703 [Show on map] Other examples - including addresses can be found here: http://lacasaporeltejado.eu/proyectos/
Surrounding environment:	Urban environment
Type of setting:	formal (commercial product)
Climate:	Temperate/Mediterranean
Sea level:	approx. 28m
Physical properties	
Site type:	developed field
Construction type:	prefabricated
Foundation type:	Not specified. The extra storeys are mounted on top of existing buildings. No information on how the connection to the existing building is made. The bottom of an add-on unit can be seen in one of the pictures. There is no information on how roof access (staircase / elevator) is managed in detail. This is most likely also different from project to project.
Building type:	house (1-2 units per building)
Weather resistance:	not specified. Assumption: quite good. Rooftop homes with lots of glass might easily heat up in Barcelona's Mediterranean climate.

Equipment & facilities:	All units are customised to the needs and requirements of the customers. Different modules can be stacked together according to rooftop properties and customer preferences. The units include built-in kitchen with electric appliances, bathroom, toilet, and often terraces or green roofs (equipped with heat- and water-stress resistant plants / succulents)
Connection to neighboring buildings:	enclosed (both sides connected with other houses/buildings)
Materials used:	composition of structure: primary cage: o single layer of mineral mortar o sandwich panel with sides of steel and o thermal insulation o more insulating material hiding the electrical system o finish: layer of sheetrock Interior and furniture come partly assembled or are finished once the unit is mounted to the rooftop.
No. of buildings:	1 add-on unit can be considered one “PUE”. In Barcelona there have been several projects implemented and additional storey constructed, thus there are now also various ”PUEs”
No. of residential units:	1 (maybe more?)
Storey count:	1-2 additional storeys on existing multistorey buildings. (On building that had not reached height limits - according to building regulations.)
No. of persons per unit:	not specified and varies from unit size and family size
Built area:	not specified, varies from case to case.
Area per person:	not specified, varies from case to case.
Integration of recreational and/or productive opportunities:	There are no extra recreational / productive opportunities integrated into this concept. However, the company argues that it would not make sense to build streets to get to cities many km away (this would be the case if the city sprawls). With their concept, they are able to compact city density while taking advantage of the existing structures / services. Thus, in the city centres (where add-on houses are built, there are many recreational and productive opportunities
Utilities	
Water supply:	connected to centralised water supply system

Sanitation system:	connected to centralised wastewater system
Electricity:	not specified, connected to centralised grid
HVAC:	not specified, connected to centralised grid
Solid waste management:	not specified, connected to central waste management system
Implementation data	
Implemented?	yes, in Barcelona. (And potentially also in other cities - Madrid, Paris, where existing building allow implementation of addon units.)
Client:	Private customers
Executing company:	La case por el tejado
Construction time:	The construction process is as follows: o design phase. The unit is designed to rooftop properties and customer requests o renovation / adaptation / construction of unit: At the same time as the renovation / adaptation in the existing building is starting, the unit is constructed off-site in a factory workshop. o Transport: Once all works have been finished and the existing building is refurbished, the unit modules are transported by truck(s) to the final location. It is put on the rooftop by cranes. o Assembly: in 1-2 days, the unit is mounted on the rooftop and interior installations are finished and ready to be lived in.
Cost of construction:	not specified. Information only available on demand.
Funding:	Private customers
Life cycle aspects	
Expected time of PUE on-site:	Permanent
Reversibility:	not specified, assumption: might be possible to disassemble the unit and remove it from the rooftops of existing buildings again.

Planned reuse/recycling:	not specified, assumption: none
Potential/planned secondary use concepts for TH-units:	
Use of reused/recycled materials during construction:	not specified, assumption: none For the terrace / green roof design, they sometimes use gravel made from recycled bricks.
Adaptability:	The add-on units are customisable. The clients are able to choose in terms of sizes, modules, orientation, features. Once everything is in place, I assume it is not intended to move around and exchange existing modules.
Innovation aspects:	Yes, as the space used for the buildings is quite unconventional (rooftops). They seem to be addressing the problem of growing cities in a new and fresh way (building up, not out)
Comments & references	
Additional references:	http://www.youtube.com/watch?v=yUgeksMARpw

Image 221: La casa por el Tejado

Image 222: La Casa por el Tejado

INTERNATIONAL TEMPORARY HOUSING EXAMPLES – GROUP E

In this section, further examples are presented (e.g., without detailed information on all above-mentioned categories or temporary housing examples that have already been included in other groups but were used in a different location).

95. ABATON CASA TRANSPORTABLE

Main source:

http://abaton.es/es/proyectos/271070769/casa-transportable-aph80

Image 223: Juan Baraja, https://juanbaraja.com/

Image 224: Juan Baraja, https://juanbaraja.com/

Project description:

There it is, on the back of a truck: Freedom to move your prefab house at your fingertips, brought to you by architects. The granite ash colored unit has everything a house needs including a bedroom, living room, bathroom and kitchen.

Particularities of the Project:

House is completely transportable.

User specific aspects	
User groups:	○ locals ○ homeless people ○ refugees
Location and environment	
Surrounding environment:	Rural environment
Climate:	Temperate
Physical properties	
Construction type:	Prefabricated building
Foundation type:	Basement

Building type:	house (1-2 units per building)
Connection to neighboring buildings:	detached (free standing)
Materials used:	Curtain walls
No. of residential units:	1
Storey count:	1
No. of persons per unit:	1
Implementation data	
Designer:	Abaton arquitecture
Executing company:	Abaton arquitecture
Cost of construction:	21.900€
Construction time:	6-8 weeks
Life cycle aspects	
Use of reused/recycled materials during construction:	Walls made by recycled wood.

96. SEVEN SKIES POP-UP HOTEL

Image 225: Seven Skies

Project description:

The concept is based on the idea of a mobile and decentralized hotel. Self-sufficient individual housing units, each of which fits in the best possible way in the surrounding landscape. Following the megatrend of the MiniMax enclosures (maximum luxury with minimal impact on nature) and natural sleep at the center of a new holiday experience.

Particularities of the Project:

On an area of 36 m² on two levels the ideal bed is hovering, flanked by two perfectly aligned terraces surrounded by unspoiled nature. Without any form of restrictive walls, without annoying neighbors, electro smog or other annoying environmental influences. Made of pure wood construction, as natural as possible and sustainable. The operation of the SevenSkies mobile residential units is with the usual connections, anchored to existing hotel structures but also completely self-sufficient.

User specific aspects	
User groups:	tourists
Location and environment	
Location:	Ziersdorf (Austria)
Surrounding environment:	Rural environment
Type of setting:	Formal

Climate:	Continental
Physical properties	
Plot area:	36 m²
Construction type:	Prefabricated building
Foundation type:	Wood pillars
Building type:	house (1-2 units per building)
Weather resistance:	
Equipment & facilities:	
Connection to neighboring buildings:	detached (free standing)
Materials used:	Curtain walls, wood
No. of residential units:	1
Storey count:	1-2
No. of persons per unit:	2
Built area:	36 m²
Area per person:	18 m²
Utilities	
Water supply:	connected to centralised water supply system
Sanitation system:	connected to centralised wastewater system

97. BLUEPRINT200 @ TAMERA

Main source:

https://deeply.thenewhumanitarian.org/refugees/articles/2018/03/29/in-portugal-environmentalists-re-imagine-refugee-spaces

Image 226

Project description:

“At the community project Tamera, environmentalists and social planning experts are planning to set up a live-in research station and educational center to explore ideas for more ecologically sound and socially inclusive refugee camps. (..) The model camp, called Blueprint 200, will be built on-site at Tamera, near Colos in southern Portugal, and will provide space to around 200 people. The design phase of the 330,000 Euro ($406,000) project was funded by a Switzerland-headquartered non-profit organization. Construction is planned to be completed in 2018” (Source: Newsdeeply)

Basic facts on user group:

200 refugees;

social innovation: “The model will be designed in a way that will encourage social interaction between inhabitants while allowing them to be as autonomous and self-reliant as possible. (..) As with any innovation, the key will be to get regular and transparent feedback from users of the model and to ensure that infrastructural projects can benefit a wider group of people” (Source: Newsdeeply)

Basic facts on location and unit features:

Tamera, Portugal;

“According to site designers, the model camp will be a fully functioning living space made up of modular compartments or living quarters that can be easily scaled up and down and adapted to fit different cultures or climates around the world” (Source: Newsdeeply)

Basic facts on water, sanitation, energy, solid waste management:

water retention landscape design;

“Designers will use the prototype camp to experiment with new technologies for sustainable water management, as well as greener ways of cooking, disposing of waste and generating electricity” (Source: Newsdeeply)

Additional sources:

https://www.blueprint-alliance.org/projects/bp200-design-solutions-regenerative-settlements

98. WOHNHEIM WÜLFERODER STRASSE

Main source:

http://www.haz.de/Hannover/Aus-den-Stadtteilen/Kirchrode/So-geht-es-mit-den-Fluechtlingen-im-Bezirk-Kronsberg-weiter

Image 227: https://www.hannover.de/Fl%C3%BCchtlinge-in-Stadt-und-Region-Hannover/Zahlen-und-Fakten/Unterk%C3%BCnfte-nach-Stadtbezirk/Stadtbezirk-6-Kirchrode-Bemerode-W%C3%BClferode/Wohnheim-W%C3%BClferoder-Stra%C3%9Fe

Project description:

Container building in Bemerode, Hannover, Germany, run by Deutsches Rotes Kreuz

Basic facts on user group:

100 fled persons (refugees/asylum seekers)

Basic facts on location and unit features:

Wülferoder Straße 30 A-B, Hannover, Germany

99. 1994 OLYMPIC VILLAGE, LILLEHAMMER

Main source:

Lillehammer Olympic Official Report Vol. III,
http://library.la84.org/6oic/OfficialReports/1994/E_BOOK3.PDF

Image 228:
http://library.la84.org/6oic/OfficialReports/1994/E_BOOK3.PDF

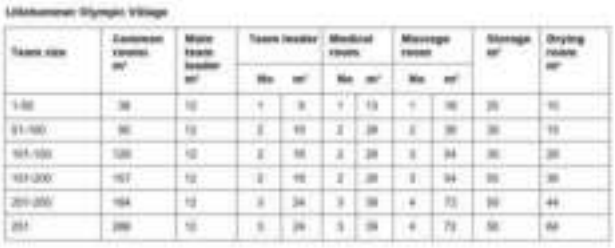


Image 229:
http://library.la84.org/6oic/OfficialReports/1994/E_BOOK3.PDF, p. 78

Project description:

For the Winter Olympics in Lillehammer, Norway 1994, a Olympic village was erected.

For a small city like Lillehammer, it was clear that after the Games there would not be a need for all the accommodation and housing built for the Olympic event. One therefore decided to build less than the village as permanent housing; the other part would be temporary housing and would be moved to other parts of the country after the Games. The permanent part consisted of 185 houses. The rest were built as movable units. The village's service centre was 7000m², after the Games this would be used as a service centre for retired persons, a cafeteria, a nursery school, and a church.

Basic facts on user group:

During the Winter Games, this village housed about 2 300 athletes and leaders from 67 nations.

Basic facts on location and unit features:

The village was built as a small town on 230 000 m² of property in Skårsetlia (three kilometres northeast of downtown Lillehammer). It was built complete with all the services required of an Olympic Village, and with a total surface area of 55 000 m².

Everything from traditional house-building techniques to prefabricated modules were used. All buildings were built of wood. The village has 18 000 m² of large, prefabricated elements.

Basic facts on water, sanitation, energy, solid waste management:

Four forms of heating energy were used in the Olympic Village homes: electricity, gas, solar energy and heat pumped from 135 metres underground.

Basic facts on implementation and life cycle:

The village was completed in December 1993. The total cost of building the village was NOK 250 million. Construction started in the autumn 1992, and the first house was completed on 10 August 1992. In order to complete the village in time, the average production per workday had to be about 250 m² of building. This level of activity was achieved by using several different builders with different modular systems and levels of pre-fabrication.

The Lillehammer Olympic Village began operations in the autumn 1993, and was tested as an Olympic training centre, primarily for Team ‘94 members. The village was also in use during the VI Paralympic Games in March 1994. Re-building and demounting began in April 1994. The permanent buildings were ready for post-Olympic use in the autumn 1994, while the farmland under the temporary part of the village will again be cultivated in the spring 1996.

100. EX-CONTAINER

Main source:

https://ac.els-cdn.com/S1687404813000461/1-s2.0-S1687404813000461-main.pdf

Image 230: https://inhabitat.com/ex-container-project-provides-shipping-container-housing-for-victims-of-japan-earthquake/yasutaka-yoshimura-bayside-marina-hotel-7-2

Basic facts on user group:

affected by disaster

Basic facts on implementation and life cycle:

Old shipping containers, modified.

101. LOG HOUSE

Main source:

https://inhabitat.com/ex-container-project-provides-shipping-container-housing-for-victims-of-japan-earthquake/yasutaka-yoshimura-bayside-marina-hotel-7-2

Image 231: http://www.midatlanticcohousing.org/cohousing-blog/maybe-the-three-little-pigs-should-have-built-a-paper-house

Project description:

17 m² house made out of cardboard tubes

Basic facts on user group:

affected by disasters

Innovation aspects:

people can help constructing; can modify easily

Basic facts on location and unit features:

Japan

102. FEMA KATARINA COTTAGE

Main source:

https://ac.els-cdn.com/S1687404813000461/1-s2.0-S1687404813000461-main.pdf

Image 232: https://www.treehugger.com/modular-design/katrina-cottage-the-new-urbanist-response.html

Project description:

small house on wheels

Basic facts on user group:

affected by disasters

103. TEMPOHOMES BERLIN

Main source:

https://www.berlin.de/laf/wohnen/allgemeine-informationen/tempohomes-faq/

Image 233: LAF, https://www.berlin.de/laf/wohnen/allgemeine-informationen/tempohomes-faq/

Project description:

small house on wheels

Basic facts on user group:

affected by disasters

Basic facts on location and unit:

There are various; one is in Lichtenberg, Berlin: 52.547941, 13.511553

A Tempohome sample site consist of

- 8 residential buildings
- 1 administrative building
- 1 building for utilities/supply
- 1 small building for gatekeeper

All buildings are composed of individual containers with a floor area of about 13 square meters. They are mostly ground level and have only the one first floor.

The residential buildings consist of residential units, each of which is self-contained and accessible from the outside on the first floor. In one housing unit there is room for four people.

Basic facts on water, sanitation, energy, solid waste management:

Each accommodation unit is self-contained and consists of three rooms:

In the center is the entrance room with the pantry-kitchen and an enclosed area behind it with a shower cubicle and toilet. To the right and left of the entrance room there is a bedroom for two persons. After staying in emergency shelters with limited privacy and canteen food, this finally gives people a smaller living unit where they can close a door behind them and cook for themselves and their family.

The apartments will be equipped with beds, wardrobes, chairs, tables, linens, and cooking and eating utensils. In addition, there are administrative, utility and community buildings at each Tempohome site. The administration building houses the operator's offices, counseling rooms, staff lounges, storage rooms, and an appropriately equipped janitorial workshop. In the utility building there are washing machines and dryers for residents to use themselves. In the community building there are children's playrooms, school study rooms, a PC room and common rooms, e.g. for social gatherings, courses or festivities. This is part of the quality requirements of the LAF.

Additional comment:

Under current building law, there is a permit for three years from the start of operation of the respective accommodation. The exception is the Tempohomes site on Tempelhofer Feld. In accordance with the Tempelhof Act, this must be dismantled by December 31, 2019.

MUF 2.0 project should replace the Thempohomes in the long term (Sources: (https://www.berlin.de/laf/wohnen/allgemeine-informationen/modulare-unterkuenfte/, https://www.berlin.de/sen/finanzen/presse/nachrichten/artikel.688079.php)

104. GESAMTUNTERKUNFT BUNSENSTRASSE, KASSEL

Main source:

http://www.foundation-kassel.de/Architekten/Projekte/Wohnen/Unterkunft-f%C3%BCr-Gefl%C3%BCchtete

Image 234: http://www.foundation-kassel.de/Architekten/Projekte/Wohnen/Unterkunft-f%C3%BCr-Gefl%C3%BCchtete

Project description:

The GU (“Gesamtunterkunft”, may translate as “general accommodation”?) consists of five three-story structures and two buildings each, which are connected by an external staircase and playhouse to form a courtyard complex. 180 refugees will be housed here not in containers but in 'normal apartments'. Later use for social housing or student apartments is planned. The extremely rapid implementation within 7 months was only made possible by close and direct cooperation between planners, the construction industry, the municipal housing association and the building authorities. The project received an award from the Hesse state initiative Baukultur.

Project: New building

Services: LP 1–5, 8 Oberbauleitung

Client: GWG Kassel

Area: GFA 3.300 m²

Completion: 2016

Basic facts on user group:

180 displaces persons

Basic facts on location and unit:

Kassel, Germany

Basic facts on implementation and life cycle:

Modules are adaptable and can be reused as housing for students or locals later on (Source: https://medium.com/la-fabrique-de-la-cit%C3%A9/rethinking-temporary-housing-and-fostering-networks-of-cities-1f9449436d32)

105. STARTBLOK RIEKERHAVEN

Main source:

https://startblokriekerhaven.nl/en/

Image 235: https://startblokriekerhaven.nl/en/living-startblok/the-grounds/

Project description:

Startblok is a housing project for young refugees who have recently received their residence permit (status-holders) and for young persons from the Netherlands. In cooperation with Socius Wonen and the Municipality of Amsterdam, housing organisation De Key is developing Startblok at Riekerhaven, a former sports-grounds next to the A10 highway in Amsterdam New West. Here at Startblok these youngsters will get the opportunity to help each other in building their futures together.

A Special Project: Startblok offers 565 housing units consisting of 463 studios and 102 rooms in multi-person apartments. The studios are about 23m2 and have their own facilities such as a small kitchen, bathroom and toilet. Each floor also has a communal living space for social activities and there are two large outside areas surrounded by lots of trees!

A Great Start For Everybody: The goal of Startblok is not only to house youngsters, but mainly to provide a good start in Amsterdam for everybody, whether they are from around or fled their country. Startblok will be a place for everyone between the ages of 18 to 28 to start building and preparing for a future together.

Basic facts on user group:

displaced young people and young locals (until 28 years old)

Social innovation:

migrants and locals living together

Basic facts on location and unit features:

Former location of sports complex Riekerhaven, Amsterdam, Netherlands

Basic facts on implementation and life cycle:

Modules are adaptable and can be reused as housing for students or locals later on (Source: https://medium.com/la-fabrique-de-la-cit%C3%A9/rethinking-temporary-housing-and-fostering-networks-of-cities-1f9449436d32)

106. LIBERTYHOME

Main source:
https://www.libertydothome.at/

Image 236: https://www.libertydothome.at/

Project description:
Small shelter with bathroom, toilette, kitchen and bed

Basic facts on user group:
homeless

Social innovation:
social business

Basic facts on location and unit features:
on FH (university of applied sciences) campus in 1100 Vienna

Basic facts on water, sanitation, energy, solid waste management:
connected to networks

Basic facts on implementation and life cycle:
Consists mainly of wood for sustainability reasons

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