





VERSAILLES
SOLAR DECATHLON
EUROPE 2014

PROJECT PROFILES

SOLAR DECATHLON EUROPE 2014

From 28/06 to 14/07

www.solardecathlon2014.fr

 @sde2014  Solar Decathlon Europe 2014



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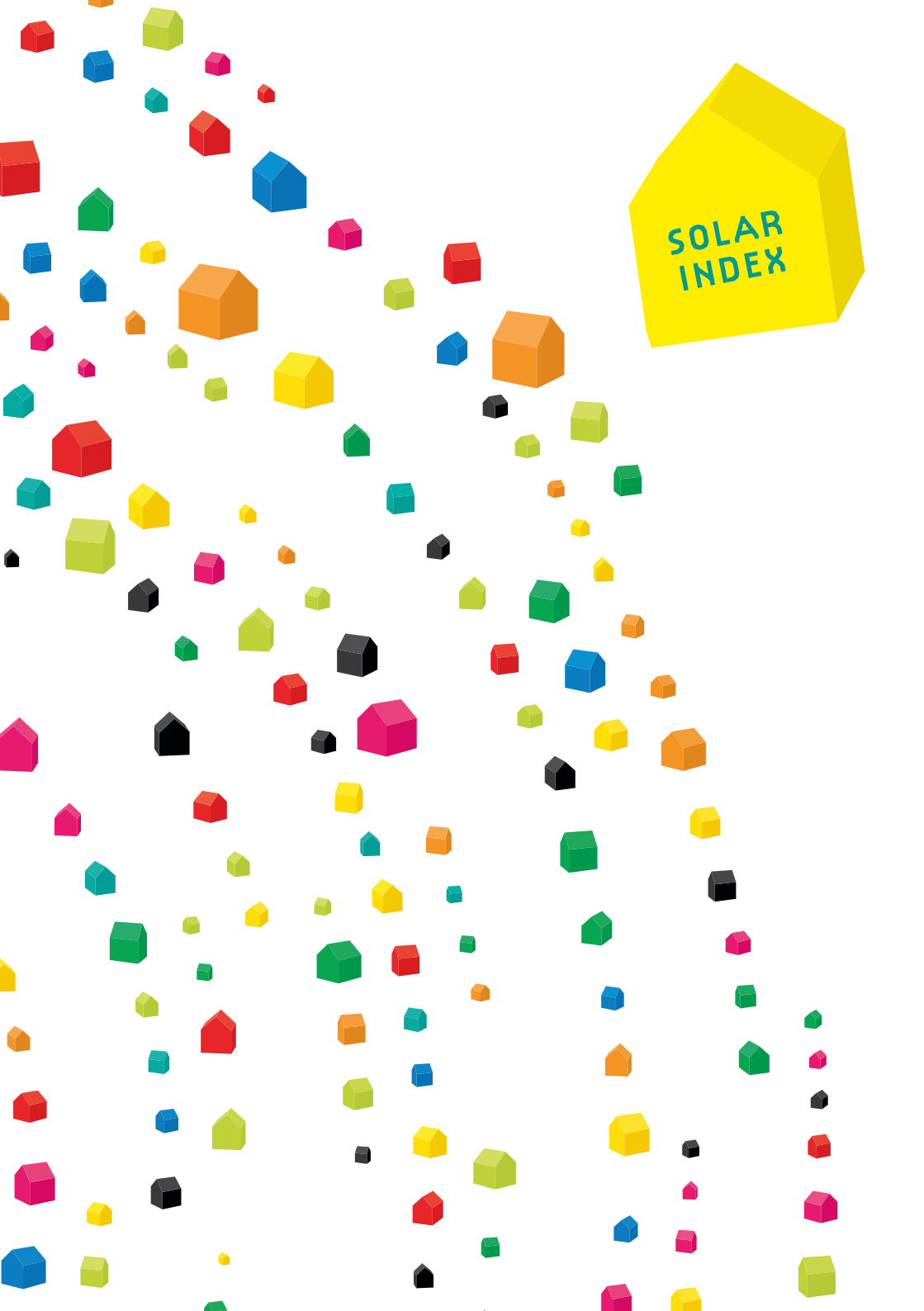


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INTRODUCTION TO SOLAR DECATHLON EUROPE 2014

SOLAR DECATHLON >

The Solar Decathlon is an international competition created by the U.S. Department of Energy in which universities from all over the world meet to design, build and operate a grid-connected, energetically self-sufficient house. The houses use solar energy as the only energy source and are equipped with all the technologies that permit maximum energy efficiency. During the final phase of the competition Teams assemble their houses, open to the general public, while undergoing the ten contests of the competition. These ten contests make this event a Decathlon.

SOLAR DECATHLON EUROPE >

The Solar Decathlon Europe (SDE) was created through a signed agreement between the Ministry of Housing of the Government of Spain and the United States Government, in October 2007, in order to organize a sustainable solar house competition in Europe, in 2010 and 2012. The 2014 edition of this competition will be hosted by France, in Versailles. The SDE 2014 Organization's goal is to contribute to the knowledge and dissemination of industrialized, solar and sustainable housing, and has the following fundamental objectives:

- > To raise participating students' awareness of the benefits and opportunities gained through the use of renewable energies and sustainable construction, challenging them to think creatively and develop innovative solutions that contribute to energy savings.
- > To encourage professionals of the building industry. To select materials and systems that reduce the environmental impact of a building over its entire lifetime, optimizing its economic viability and providing comfort and safety of occupants.
- > To educate the general public about responsible energy use, renewable energy, energy efficiency, and the technologies available to help reduce energy consumption.
- > To emphasize a correct order of intervention: the reduction of building energy consumption for increased energy efficiency, integrating solar active systems and other renewable technologies. Building systems must be selected and dimensioned using environmental and cost-effective criteria.
- > To encourage the use of solar technologies.
- > To promote architecturally attractive solar system integration, working on using solar technologies to replace conventional construction materials in the building envelope such as the roof, skylights or facades.
- > To clearly demonstrate that high performance solar homes can be comfortable, attractive and affordable.

With this **new edition in 2014** in France, development of the Rules refines the requirements to be met by Teams & their projects.

A key objective is to provide habitats that answer to today's triple challenges: energy, environment and society. The evaluation of the proposed projects, via the 10 criteria of the Decathlon, covers

major issues related to houses of the future.

The 2014 Solar Decathlon Europe Organization in France has decided to focus on the six following issues:

1/ DENSITY

Density is needed to minimize environmental impacts. Collective housing projects are encouraged rather than individual houses.

2/ MOBILITY

The Solar Europe aims to be a testing ground for innovative solutions merging urban design housing and transportation systems.

3/ SOBRIETY

While it is important to ensure a renewable energy supply, it is even more important to limit demand.

4/ INNOVATION

Innovation remains at the heart of the competition, covering fundamentals from architecture to house appliances.

5/ AFFORDABILITY

Teams should keep in mind that affordability remains the key issue for applicable sustainable architectural and urban solutions.

6/ LOCAL CONTEXT

Each project must be a quality response to the cultural, climatic and social contexts of each team's region.

DIVERSITY OF PROJECT PROFILES >

In 2014, Versailles will welcome 20 teams originating from 17 countries and 3 continents. Each Team has to come up with a zero-energy housing solution that fits the context and specificities of its homeland. This desire to take into account the environment in which the prototype is meant to evolve provides this 2014 edition with various and distinct profiles tackling themes as broad as:

New housing typologies

Sharing & community

LUCERNE TEAM SWITZERLAND
BARCELONA TECH 2014 SPAIN

Building on top & density

ONTOP GERMANY
TEAM ROOFTOP GERMANY
PLATEAU TEAM SPAIN
TEAM UNICODE TAIWAN

Innovation

ROME 4 DENCITY ITALY
DELFT VERSAILLES 2014 NETHERLANDS
ATLANTIC CHALLENGE FRANCE
DTU TEAM DENMARK
TEAM BUCHAREST 2014 ROMANIA
PARIS FRANCE

Facing major natural threats

Earthquakes

CASA FENIX TEAM
CHILE/FRANCE

Floods

KMUTT TEAM THAILAND

Tsunamis

CHIBA UNIVERSITY
JAPAN

Drought

TEAM MEXICO UNAM MEXICO

New urban types & innovation

INSIDE OUT USA/GERMANY
RÉCIPROCITÉ USA/FRANCE

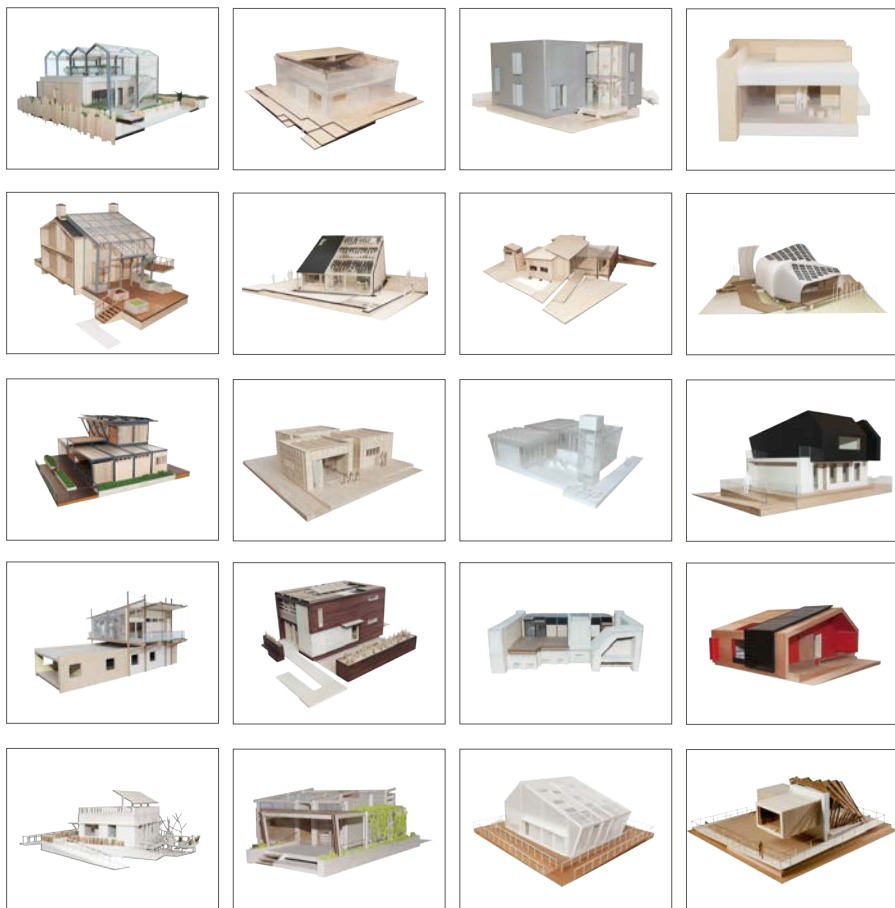
Facing major social issues

Aging population

TEC TEAM COSTA RICA

Population expansion

TEAM SHUNYA INDIA



SOLAR TEAMS

- > 20 official teams
- > 20 zero energy prototypes
- > 16 countries
- > 15 official languages
- > 3 continents
- > 41 universities

PROJECT NAMES	COUNTRIES
PHILÉAS	FRANCE
RESSÒ	SPAIN
EFDEN	ROMANIA
RENAIHOUSE	JAPAN
HOME WITH A SKIN	NETHERLANDS
EMBRACE	DENMARK
CASA FENIX	CHILE+FRANCE
TECHSTYLE HAUS	USA+GERMANY
BAAN CHAAN ADAPTIVE HOUSE	THAILAND
YOUR+	SWITZERLAND
CASA	MEXICO
ONTOP	GERMANY
LIV-LIB'	FRANCE
SYMBCITY	SPAIN
MAISON RECIPROCITY	USA+FRANCE
RHOME FOR DENCITY	ITALY
ROOFTOP	GERMANY
H NAUGHT	INDIA
TROPIKA	COSTA RICA
ORCHID HOUSE	TAIWAN



20 OFFICIAL TEAMS WILL COMPETE IN LA CITÉ DU SOLEIL® IN VERSAILLES IN JUNE AND JULY 2014



TEAM **Atlantic Challenge**

PROJECT **Philéas**

NEW HOUSING TYPOLOGIES

Innovation

«Retrofitting historic buildings and transforming a neighborhood by introducing urban agriculture»

The Philéas project is about the complete rehabilitation of the Cap 44, an industrial building built in 1895 which, after various functions, from an agricultural co-operative to an office building, is presently vacant. With an ideal location on the border of the Loire, the structure can become a center of urban market gardening.

Philéas intends to create housing, offices and a restaurant which will use vegetable production from the building's rooftop. This last purpose will be enabled through a double slope photovoltaic glass roof with integrated monocrystalline double glass modules.

The prototype module presented in Versailles will be available in a reduced version of this glass roof. This one should provide a maximum of natural light in the central atrium of the building and in the farming section located on the roof.

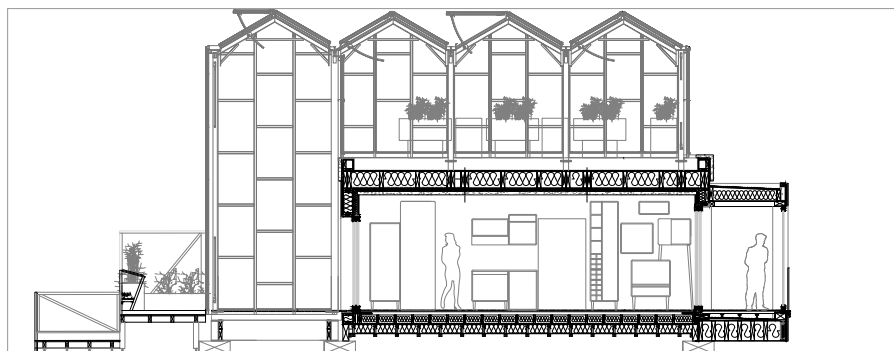
The 35 modules of the prototype (5 kWc) will be strategically spread on the four slopes exposed to the south. The slope in the south frontage is entirely covered by modules; the higher section of the three others is also equipped with modules, maximizing the provision of light while avoiding the risk of shadows on the cells.

The greenhouse will be ventilated in the case of overheating in summer; roof lights will be able to open, at a maximum angle of 18° in order to limit the risks of shading and the loss of photovoltaic production.

The solar system will be divided into two sections, the first one will supply a park of eight lead batteries (5,8 kWh) in direct current. The other will supply the building with an alternative current. The batteries will be directed so as to clip the consumption peaks.



<http://www.solar-phileas.com>



TEAM **Ressò**

PROJECT **Ressò**

NEW HOUSING TYPOLOGIES

Innovation



«Retrofitting existing buildings and transforming a Barcelona peripheral city by introducing a new social function: gathering and sharing»

The Catalan project is inspired by the consequences of the real estate bubble which struck Spain from 1997 to 2007.

Today, there are 800 000 empty housing units, most of them unfinished, 100 000 of which are in Catalonia.

Also, a large part of this uninhabited real estate park shows poor energy performance.

Ressò, a name derived from “restoration and sustainability”, proposes a prototype of low-cost construction with variable usage, which could be used after the Solar Decathlon as a community

house in the rural city of Sant Miquel de Riudaura, situated at 45 km in the north of Barcelona.

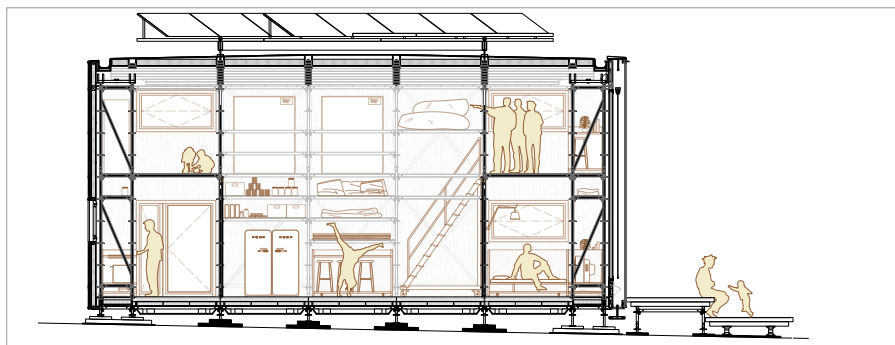
The prototype consists of a parallelepiped unit with a supporting structure made of scaffolding.

The two south façades are covered by translucent polycarbonate in order to generate passive solar energy.

The two north façades and the roofing are insulated. The photovoltaic panels are mounted on a frame placed on the roof deck, facing south with a slope of 25°.

Given that the solar energy has to be the principal source of energy for the prototype, the machinery within the house are automatic in order to consume the electricity the moment it is produced. Ressò does not plan to resort to batteries.

<http://www.resso.upc.edu>



RESSÒ Solar Decathlon Europe 2014



@RESSO sde14



TEAM EFdeN

PROJECT EFdeN

NEW HOUSING TYPOLOGIES

Innovation

«Filling the gaps and reconquering the brown fields by introducing Nature in the existing city fabric»

The EFdeN project hopes it could give back its luster to Bucharest, tarnished by economic stagnation and the architectural austerity of the Communist Bloc.

In order to make the city more dense, the project goal is to create a residential area in an abandoned industrial plot in the Obor district.

The project will weave the smaller developed communities with green spaces, as well as an area of urban farming to be used to foster a sense of community and social interaction. Likewise, the buildings will be equipped with wide greenhouses offering a vast view outdoors while allowing the vegetation to bloom.

The prototype is a bioclimatic duplex of 110 m², equipped with a solar greenhouse integrated on its south frontage. The roof deck will be holding a photovoltaic system of 5 kWc on a frame.

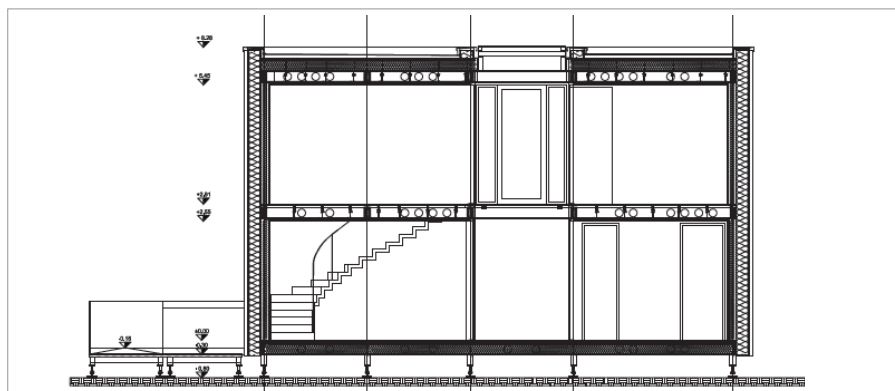
The modules will be tilted to 5° in the final project, but to an angle of 68° compared to the azimuth during the competition.

The connected system will also be equipped of a park of batteries in order to stock up on energy that can't be used during the day, for the needs of the evening.

The house will be equipped with a home automation to optimize energy saving and thermal comfort, as well as indoor air quality.



<http://www.teambucharest.com/>



TEAM Chiba University Japan

PROJECT RenaiHouse

FACING MAJOR NATURAL THREATS

Tsunami

Rebuilding Fukushima area after the 2011 tsunami disaster.»

The name of the project stems from the idea of “rebirth”.

The goal is to create energy efficient habitats in the context of rebuilding of Rikuzentakata, in the Tohoku region, which was devastated by the earthquake and the tsunami of 2011.

The habitats are to be energy efficient, supplied by renewable energies. The project RenaiHouse consists of a real estate section mixing private and public areas – offices, schools, health centers, and communal spaces – in order to favor the rebirth of communities shattered by the disaster.

The prototype presented is one of the constituent modules of the set. It is made of wood and built up of supporting wood frames

and of insulated panels with wool insulation for the floors.

The habitat is prefabricated in a workshop and can be easily transported in a container.

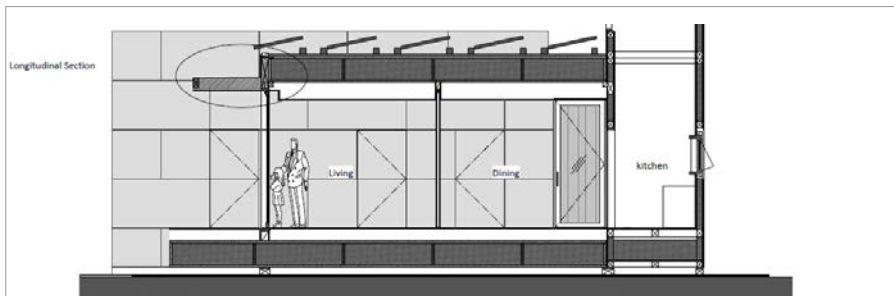
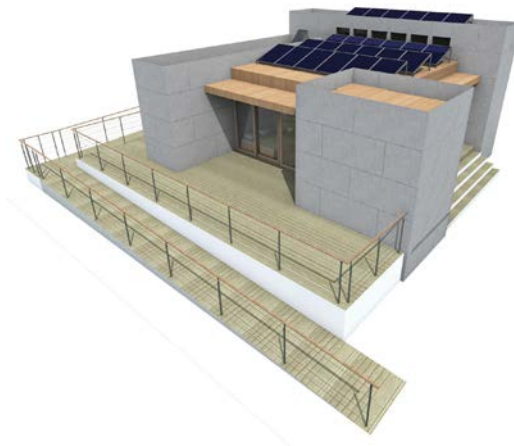
The prototype is designed under the concept of the “smart house”, equipped with sensors that enable full control energy and air flow in the house. The photovoltaic system of 5 kWc will be integrated in the east and west façades and also in the roof deck.

Electricity is stored through the battery of an electric car (24 kWh), which is shared by several inhabitants.

The battery of the vehicle will be able to charge up and discharge in order to deliver necessary currents for other uses.



<http://www.solardecathlon.jp>



TEAM Prêt-à-Loger

PROJECT Home with a skin

NEW HOUSING TYPOLOGIES

Innovation

«Retrofitting typical Dutch row houses by adding a new skin on top of existing buildings»

More than 60% of habitats in the Netherlands are composed of row houses with garden, usually poorly insulated.

Instead of demolishing to rebuild with a corresponding environmental and financial burden, the project The Skin offers proposes the application of a second skin to this type of house, specifically a solar greenhouse on one of its façades.

The project of rehabilitation concerns a street of row houses built in 1963 in the village of Honselersdijk, 11 km to the South of The Hague.

The project seeks to maximize energy and food production with fruit-trees, berry bushes and vegetable plots. The detached house presented

in Versailles will be a small scale model replica of one of the houses to restore. It will be built in wood panels and equipped with a double skin.

A home automation will control ventilation, sun protections, lighting and the heating system.

The photovoltaic system of 5 kWc will be composed of monocrystalline semi-transparent double glasses integrated to the solar greenhouse.

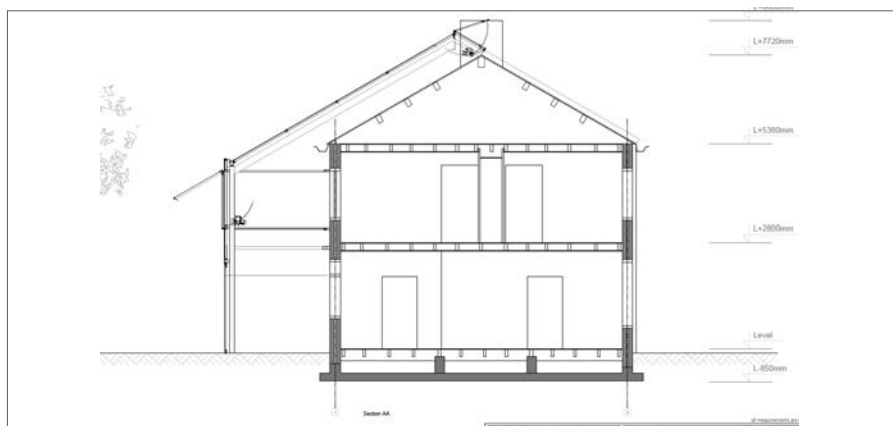
Twenty modules will be located on the roof of the greenhouse and five of them on front façades.

Each module will be equipped with a maximum power point tracker (model P300 of Solaredge), replacing the traditional junction box which optimizes the yield of each panel.

This package enables the maintenance of the outgoing voltage at an optimum level for the inverter.



<http://www.pretaloger.nl>



Prêt à Loger



@Pretaloger



TEAM DTU Team

PROJECT Embrace

NEW HOUSING TYPOLOGIES

Innovation



«Building sustainable housing in Copenhagen Nordhavnen new developments»

The Embrace project plans to densify the habitat in areas to be rehabilitated by constructing an additional floor on top of existing buildings. Its particularity is to articulate the transition from private to public spaces, via a buffer zone protected by a «climate shield.»

This will be a glassed sloping roof covering thermally insulated private modules (for common areas), open greenhouses and circulation passageways.

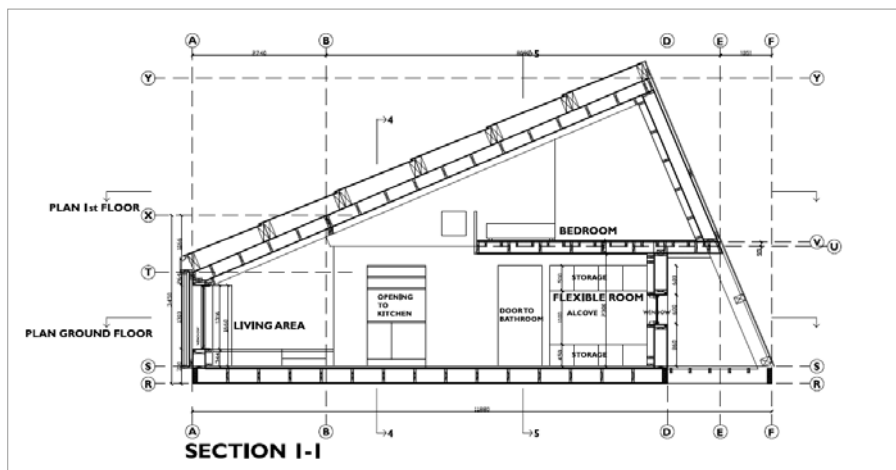
The project plans to conduct testing of this concept in the suburb of Nordhavnen, north of Copenhagen, which includes a port area.

The prototype in Versailles will consist of a wooden frame for private spaces, with an efficient thermal envelope, with prefabricated panels containing two crossed layers of insulation (fibreglass). The slope of the «climate shield» will be covered with two types of modules - blackout monocrystalline modules for heated sections, semi-transparent double modules for open spaces.

In marketing the Embrace concept, the arrangement of cells could be organized in irregular units in keeping with the well-known Danish design approach.

The project does not intend to use a storage system and is simply connected to the network in order to inject surplus electricity.

<http://www.solardecathlon.dk>



TEAM Team FENIX

PROJECT Casa FENIX

FACING MAJOR NATURAL THREATS

Earthquakes

«A post-earthquake sustainable housing unit composing a sustainable community for relief»

Motivated by the reality of Chile's devastating earthquakes, Casa Fenix offers modular and flexible habitats which can be built by victims in emergency situations.

The name of the project, extreme, is based on the notion of emergencies due to extreme natural disasters.

The modules are designed with a wood frame and prefabricated to be easily assembled by teams of volunteers dispatched on disaster sites.

The prototype presented in Versailles will be produced at the University of La Rochelle. This is a module of "survival": the structure, an alternation

of posts and panels, and the envelope, consisting of carried manually light elements, which can be quickly assembled by non-specialists.

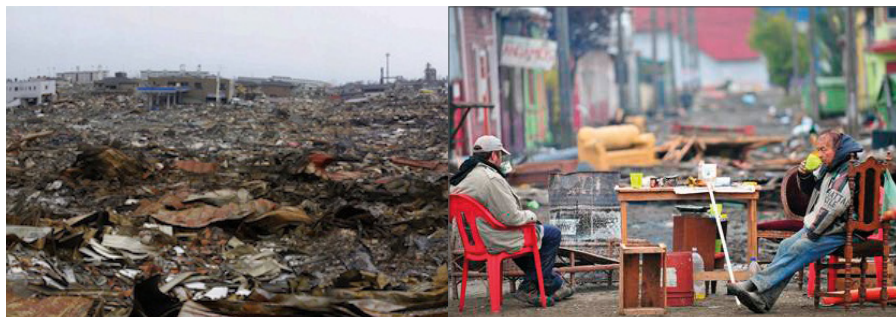
The photovoltaic installation is limited to 3.9 kWc of polycrystalline modules, with respect for economic constraints.

The 15 modules are placed on the roof using an aluminum frame with a 17° slope orientated to the south.

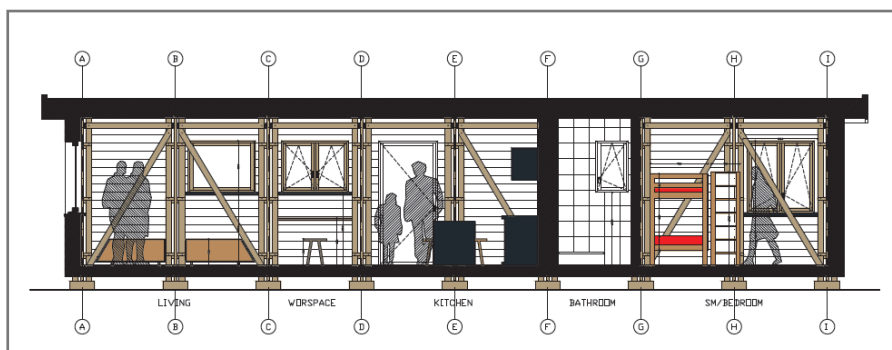
Significant energy is used for the production of sanitary hot water, in combination with a solar thermal sensor.

Simulated electric consumption comes from the production of this hot water and of the dishwasher.

In this way, nearly half of electric production can be self-supplied, without another storage device, while the excess is injected into the network.



<http://www.casafenix.cl>



TEAM **Inside Out**

PROJECT **Techstyle Haus**

NEW URBAN TYPES & INNOVATION



«Promoting highly performing textile for students residence»

The Techstyle project seeks to revisit the architectural concept of building with solid materials.

The goal with Techstyle is to conceive a habitat with the energetic standards of Passive House (Passivhaus), with organic forms equipped with a textile sleeve. Opposing the default vision that the rural habitat must comply with traditional building approaches, Techstyle imagines a new rural habitat with a minimal ecological footprint.

The project involves the construction of a set of textile buildings which can accommodate nearly forty students on a campus for art and design in the French domain of Boisbuchet de Lessac (Poitou Charentes). Techstyle is a pile habitat equipped with a metallic structure. Between each metallic shackle, several textile layers will be taut.

The inside skin is a material of water-resistant Sheerfill fibreglass, often used to cover stadiums.

The insulating material will be maintained by a nylon wire network, while a new layer of synthetic fabric will act as an interior finish.

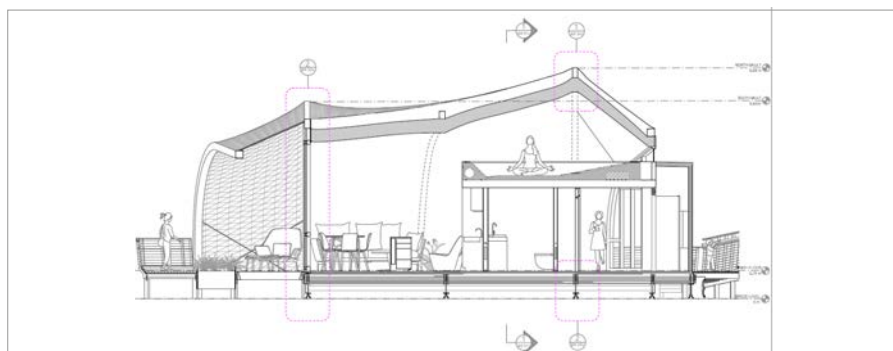
The photovoltaic system will be integrated to the top deck roofing thanks to the encapsulation of groups of 21 monocrystalline groups in a layer of vinyl.

The cells will be deployed in two places on the roofing, a surface area of 17.7 m² in the north part and 5.3 m² in the south part.

The cells that mold the round of the roofing will have different angles of incidence in relation to the sun.

In order to limit any energy loss, the German-American team plans to resort to power optimizers, managing each set from 63 to 84 cells.

<http://www.techstylehaus.com>



TEAM **KMUTT Team**

PROJECT **Adaptive House**

FACING MAJOR NATURAL THREATS

Floods



«Fighting constant floods as a strong and united community»

The Thai team offers an architecture that adapts itself to natural disasters.

The project concerns a suburb in the south-west of Bangkok, the district of Bang Khun Thian, located in an area prone to flooding.

The Adaptive House is a construction on two floors with a steel structure (hot rolled steel), water-resistant material that cannot be deformed.

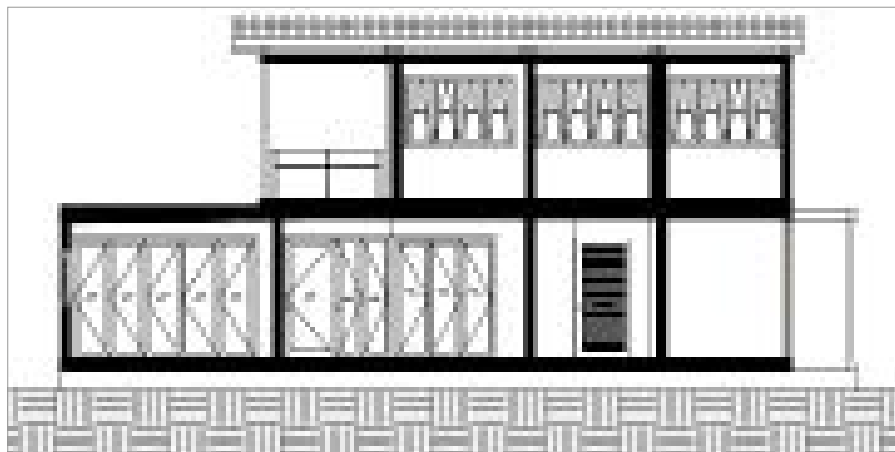
The house, inspired by traditional Thai architecture, is built on piles in order to support rises of 60cm. Beyond 60cm, in the case of a flooded ground floor, inhabitants can take refuge upstairs and preserve self-sufficiency for three days.

The materials are chosen for their water-resistance, bamboo planks for patios and weather-boarding, sandwich foamed polyurethane between panels of fibre cement for the insulation, vinyl coating for the internal flooring and laminate for interior finishings.

A facility of 4,6 kWc is fixed on the roof of the prototype, hooked up to a park of four batteries, for a storage capacity of 6kWc.

The 22 monocrystalline modules will cover 70% of the surface area of the roof, the 30% remaining are available for thermal sensors.

There also, the photovoltaic systems provide the house with an electric autonomy for three days.



TEAM Team Lucerne - Suisse

PROJECT Your+

NEW HOUSING TYPOLOGIES

Sharing & community



«Enhancing social interactivity: from the pavillion to the whole city»

The Swiss project seeks to maximize habitable spaces through sharing in the model of residence cooperatives.

The goal is to reduce the consumption of space moving from today's 50m² per person to 35m² per person.

The project considers the building of a block of flats in the Industriestraße of Lucerne, an urban center with good public traffic connections. The inside of the building is organized into four types of spaces. The 'my room' is designed for the strictest privacy; bedrooms are equipped with bathrooms. The semi-common "our room" holds the kitchen and the living-room and can be occupied by two to five people. The "your room" is meant for community

living and which can have various uses. All of them are linked by circulation spaces "spaces +" conducive to exchange and social exchange.

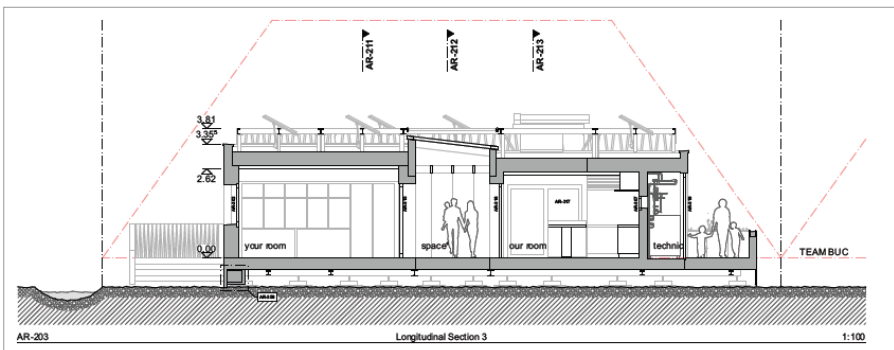
The prototype presented in Versailles will expose three rooms, conceived like three distinct parallelepiped spaces linked by a "space +"

The photovoltaic installation has fourteen monocrystalline modules of 335 Wc, with a total power of 4,62 kWc, located on three areas of the prototype.

The modules are built on a rotary axis following the sun on its run east-west, in order to maximize the production of the panels. The yield of the modules (21%) allows the installation to occupy just 23 m².

The installation is linked to a park of batteries with a storage capacity of 4,62 kWh to which are added three electric bikes representing an additional storage of 1,18 kWh.

<http://www.solardecathlon.ch>

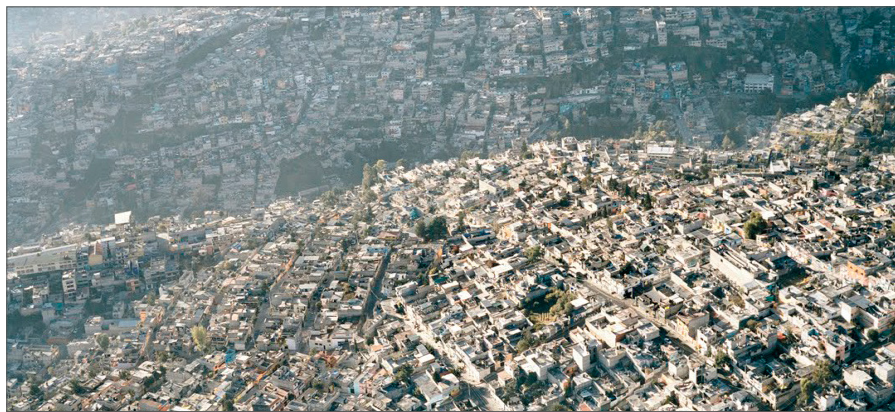


TEAM Team Mexico UNAM

PROJECT CASA

FACING MAJOR NATURAL THREATS

Drought



«Water and drought issues and housing for the poorest in the gigantic city of Mexico»

The Mexican team offers more than a type of “toolbox” habitat for acting on the densification of the Mexico metropolis.

The city has indeed many voids or unfinished auto-construction, most of which are based on reinforced concrete. Casa is a construction system based on light and prefabricated elements, to denser the «hollow tooth» in an economic manner.

The toolkit provides a system of modular support structures, panel walls and roofs covered with textile isolated cladding for walls and a waterproof membrane for roofing.

It also includes a water tank housed in a minitower and even furniture designed according to different hubs (kitchen, bathroom, cot, etc...).

The Casa concept introduces three models for the prototype of Versailles.

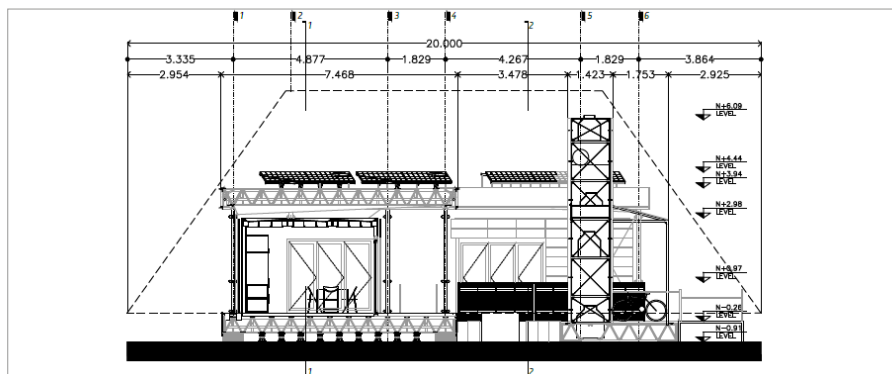
Each of them will be equipped with monocrystalline modules mounted on the frame and connected to the grid, without a battery, to minimize costs and an ecological footprint.

<http://dsolar.mx/site/en/>



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AND POLITICAL SCIENCE

Mexico City
MEXICO



CASA UNAM 
@CASA_UNAM 

TEAM OnTop

PROJECT OnTop

NEW HOUSING TYPOLOGIES

Building on top & density



«Symbiosis and vertical density»

Despite the demographic decline of the German population, which could increase from 83 million today to 65 million in 2060, cities continue to grow.

To preserve the quality of life in urban contexts, cities must strike a balance between habitat density and open spaces, especially green spaces. The Ontop project aims to build additional housing on top of existing buildings, starting with a demonstration project located in the center of Frankfurt Mousonstraße.

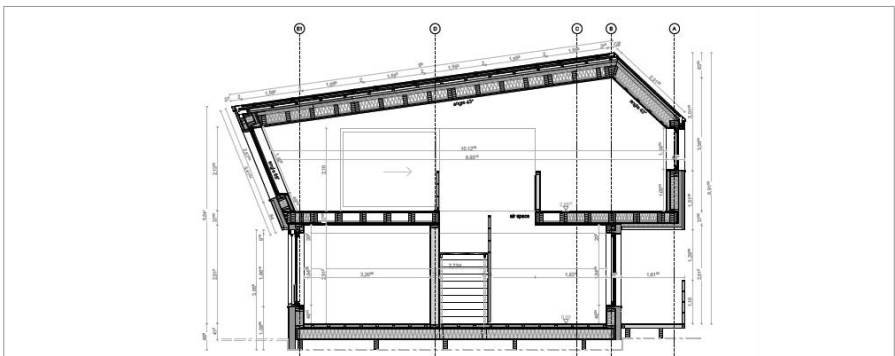
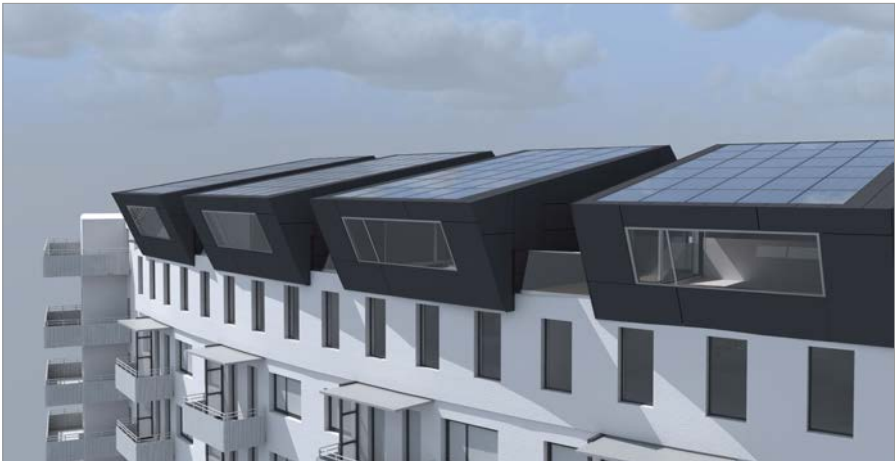
The additional floor will consist of five segments interspersed with terraces. These buildings will be light-weight, with timber frames and tiles imitating the traditional fibre cement slate roofs of Frankfurt.

The new units are described as true symbionts of the old building, providing thermal protection and surface energy production.

The new roof will have two slopes, while reducing the north slope at a minimum in order to increase exposure to the sun on the south slope surface. This will permit a 40 kWp installation on the five segments of the project.

One of them will be exposed to Versailles, and power installed on this prototype will be limited to 4.7 kWp monocrystalline modules. A battery with a capacity of 5 kWh will increase consumed electricity and will release the mid-day point of production to relieve the network, as per the German context of a high penetration of solar energy (35 GWp installed).

<http://ontop2014.de/>



OnTop - Solar Decathlon 2014 Team Frankfurt



TEAM Team Paris

PROJECT LiveLib

NEW HOUSING TYPOLOGIES

« The infrastructure of the city at the service of citizens »

The Paris team intends to employ a “plug and play» concept into the context of a building. Live-Lib’ buildings would thus consist of three distinct elements.

The heart of the building, the «hub”, includes all technical services, energy production, distribution and recycling of water, ventilation, etc...

The hubs are connected to “capsules”, removable living spaces or offices, dependent on the «port», a connection interface. The capsules are designed to be disconnected, transported by truck and connected to another hub, facilitating mobility for inhabitants.

The prototype of Versailles will present a section of one hub and two capsules, a 34 m2 apartment and a workstation area of 25 m2.

These will be connected on the north side of the hub, to leave the south open and well-lit.

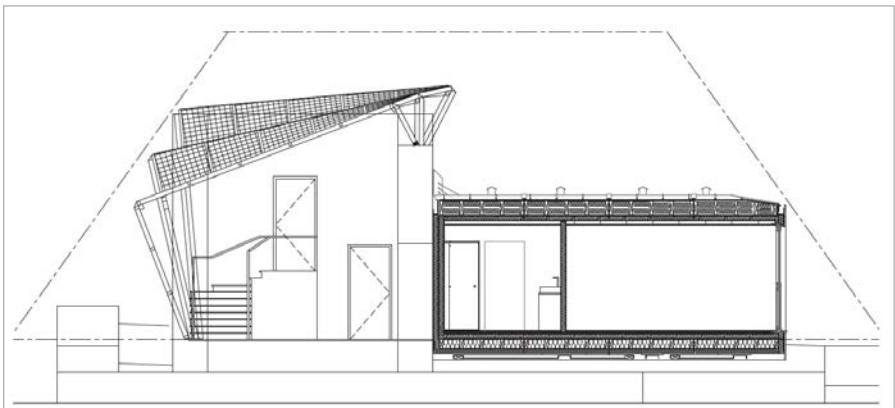
The south side also will be used for the production of photovoltaic electricity through two innovative technologies.

Parisians will aim to install PV modules composed of layered superimposed luminescent solar concentrators (LCS) and thin CIGS films. These LCS cells, developed by the Italian universities of Trento and Ferrara, are plastic plates containing a luminescent dye that retransmits light when hit by sunlight.

Thus, it is sufficient to have photovoltaic cells on the outer edge of the plastic plate to generate power, reducing the amount of semiconductor material required. In addition, the light is re-emitted in all directions, an initiative of CIGS cells produced by the French start-up Nexcis, which can be placed under the plate to increase production.



<http://www.solardecathlonparis.com>



TEAM Plateau Team

PROJECT SymbCcity

NEW HOUSING TYPOLOGIES

Building on top & density

«Density at the service of the community»

The Spanish team calls for the «colonization» of rooftops, creating a harmonious additional floor to old timber frame buildings, resulting in a new symbiotic living situation.

The profits from the sale of new the homes could contribute to the renovation of the existing building. Spanish universities are planning to carry out the operation of urban renewal in the Manoteras neighborhood, in Madrid, a residential area built in the 1950s.

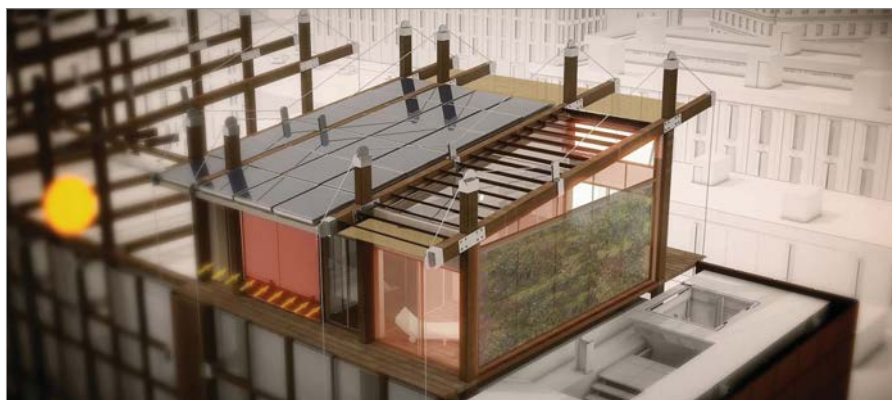
The flooring of the new storey will reach a meter beyond the two facades of the building, creating of a double-glass skin, improving the heat resistance of the old walls. The prototype presented for the Competition consists

of an apartment designed for two people, perched on a 1,30 meter-high host' building.

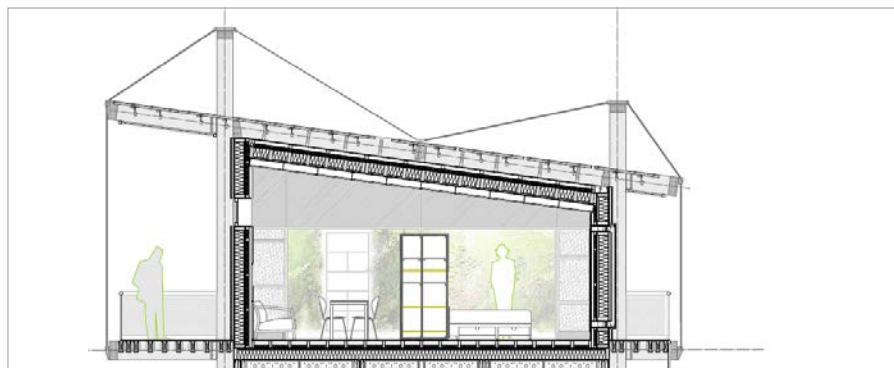
This prototype consists of two parts, a studio and a multipurpose space. The studio is insulated to passive house standards (Passivhaus) and equipped with phase change materials to provide good thermal regulation.

The use of multifunctional spaces varies seasonally: in summer, there are shaded terraces with cross ventilation, welcoming vertical vegetation; in winter, the shell can be completely closed by the rotating blades of the roof and thus creating a solar greenhouse.

The single slope roof provides 4.8 kWp thin-film CIS modules for the studio underneath, which enable quality performance in high ambient temperatures.



<http://www.plateauteam.com>



TEAM Team Réciprocité

PROJECT Maison Reciprocity

NEW URBAN TYPES & INNOVATION

«Achieving regional universality»

Maison Reciprocity revisits the established townhouse, notably those of the traditional habitat on both sides of the Atlantic.

For this, the Franco-American Team designed a modular housing unit, adapted to the urban context, for use as a single-dwelling home with the potential to assemble into a collective housing building. The modules of this house consist of three interrelated components: «Urban Shell» (urban envelope) providing passive standard thermal insulation, «Chord», the heart of the habitat, housing facilities (bathroom, kitchen) and «Living Brise-Soleil» consisting of facade and roof components ensuring climate protection and energy production.

The prototype of Versailles will consist of three prefabricated elements, a feature conducive to industrial production.

The roof terrace of the prototype will be equipped with 20 monocrystalline modules with a total capacity of 4.8 kWp.

They will be fixed to the chassis of galvanized steel at an 18° angle. The facility will be hooked up to a fleet of 16 lead-acid batteries with a total capacity of 6 kWh. The entire system is designed to maximize consumption.

It will be driven by a power management unit, moving consumption during PV production. It will also charge the batteries in an intelligent way to clip the injection point on the network during the peak production of mid-day. The batteries powering low-consumption devices will cover a third of Reciprocity house's electricity needs.

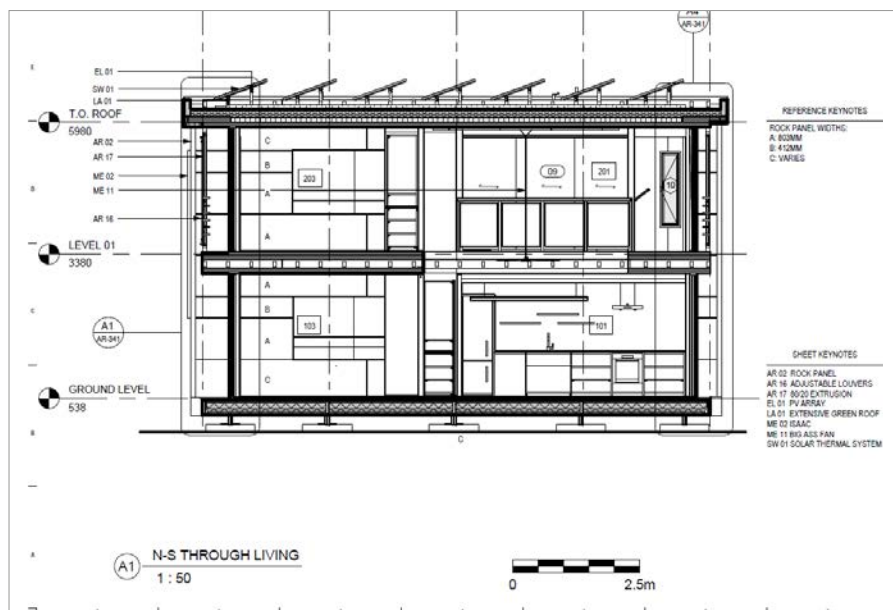




MAISON
RECIPROCITY

UNIVERSITÉ D'ANGERS
APPALACHIAN STATE UNIVERSITY

Boone/Angers
USA/France



TEAM Team Rhome

PROJECT RhOME for denCity

NEW HOUSING TYPOLOGIES

Innovation



«Re-densify and re-qualify the boundaries of an ancient city»

The roman project is intended for the Tor Fiscale district, in a 30 meter high Middle-Age structure in the south-east section of Rome, near the remains of ancient aqueducts.

RhOME (A Home for Rome) is part of an urban regeneration program for the district, with a goal to replace illegally inhabited buildings with performant and ecological habitats. These building sites will become small collective housing communities, all designed with attention to detail. The ground floor is a foundation of reinforced concrete supporting a wooden-framed four-storey structure, a total of 12 apartments. These are arranged around a central column for technical spaces: kitchens, bathrooms, ventilation systems etc... The specificity of the RhOME project

is the simultaneous integration of photovoltaic on roof top & façade. The photovoltaic modules are integrated into the removable occlusions of the main bay windows.

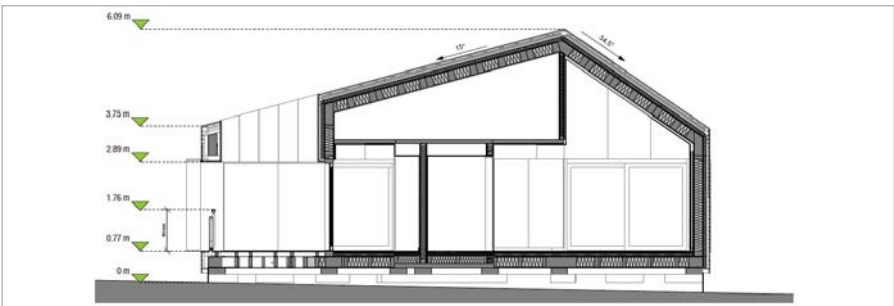
The Team from Rome will present a 60m² apartment in Versailles, a component of the project's final section.

The 5 kWc photovoltaic modules will cover a continuous current line of the roof slope to the base of the façade on the south side of the prototype.

The chosen technology is that of flexible monocrystalline modules Solbian (with SunPower cells) because of their light weight and resistance to harsh conditions (salt water, shock, etc...).

The pan of photovoltaic façade can shift from a 15 ° angle on the extension of the roof modules, in order to increase system productivity.

<http://www.rhomefordencity.it/>



TEAM Team Rooftop

PROJECT Rooftop

NEW HOUSING TYPOLOGIES

Building on top & density

«Exploring rooftops»

The Berliners from Rooftop Project also want to invest in roof space. Berlin has a large number of abandoned roofs and unused attics suitable for extensions.

The project consists of a studio designed for singles aged 25 to 45 who want to live in performant & communicative housing systems, while residing within their initial communities.

The new unit has a wood structure with fully glassed north and south facades, allowing for natural light.

The housing unit must service the host building, producing as much energy as possible. For this, the extension of the roof is flat and entirely covered with thin CIGS film modules. The north and south facades are composed of eight automatic, horizontally-placed control panels.

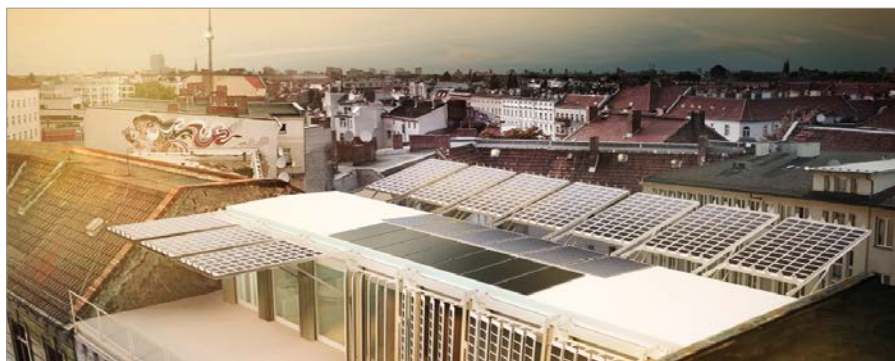
The upper part of these panels holds the CIGS.

Thus, when the sun appears, the facade panels are folded along the path of the sun, toward a horizontal position, increasing the surfaced exposed to the sun.

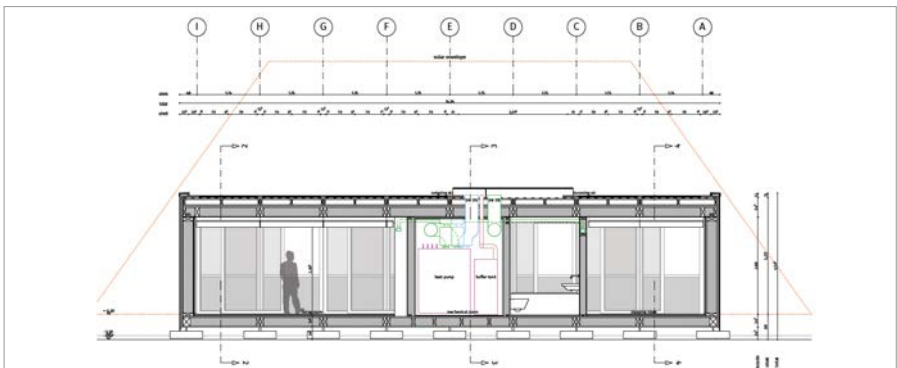
The photovoltaic modules are managed by power optimizers to ensure system performance, despite the variations of angles. Each panel can be folded independently according to the wishes of the occupants.

In winter, on overcast days, the panels cover the windows, enhancing thermal protection.

This installation, connected to the grid, will also feed a fleet of lithium-ion batteries, located on ground floors and allowing, among other things, the charging of electric bicycles.



<http://teamrooftop.de/>



TEAM Team Shunya

PROJECT Project H Naught

FACING MAJOR SOCIAL ISSUES

Population Expansion

«New urban lifestyles in gigantic indian cities, 31 000 inhab/km2 up to 50 000 inhab/km2»

Almost 60% of India's population lives in ever-growing & expanding cities. In Bombay, dwellings range from shantytowns to high-standing apartments.

The team from India offers a new type of sustainable building, an affordable living solution for the middle-class. The approach consists of four levels built on a metal framework system boasting a high-performance skin.

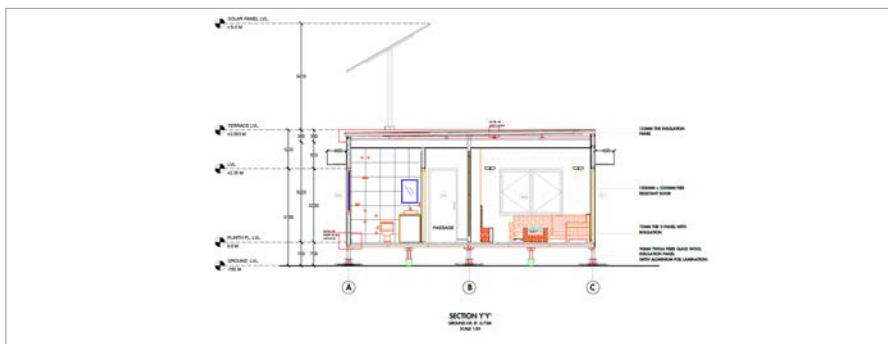
The prototype reveals a three-room apartment, adapted for a family of four on the top floor.

The rooftop, transformed into a terrace space, will hold a 4,9 kWc photovoltaic system on a one-axe tracker which will follow the sun's course and maximum horizon.

While increasing the production of energy through monocrystalline panels the tracker creates shadow for occupants on the terrace space.

The Indian manufacturer of the tracker, SmartTrak, has produced this system for photovoltaic solar parks. Applying this system into a residential configuration is an innovative first.





Team Shunya



@TeamShunyaSDE14



TEAM **TEC Team**

PROJECT **Tropika**

FACING MAJOR SOCIAL ISSUES

Aging population

«Affordable housing solution for the elderly in La Merced district, City of San José, capital of Costa Rica»

The La Merced neighborhood in the Costarican capital of San Jose includes numerous undefined areas, some of which have been transformed into parking lots; there are also many abandoned buildings which appear to be poised for demolition.

The Trópika project seeks to build a series of four to five-story residential and commercial buildings designed to address tropical climates and urban densification.

As in Europe, with ever-growing populations of seniors, Trópika seeks to develop and adapt residential dwellings to the needs of the elderly.

The Team's proposal consists of a two-building complex linked by an overhead bridge system with encased vestibules, passageways and technical casings.

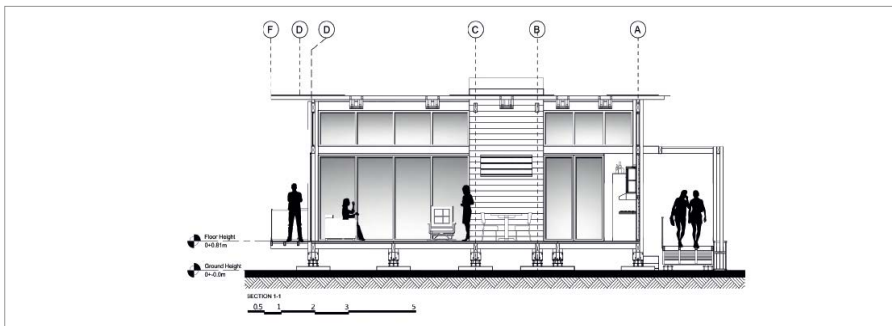
The bioclimatic buildings rely on a glued-laminated wood structure, complimented with teak wood, (a local resource covering floorings, exterior walls, terraces and even ceilings). The residences are structured into 55m² and 74m² apartments.

The prototype at Versailles will reveal a 55 m² apartment. Its north façade is predominantly open to facilitate natural ventilation (in view of the predominant Costarican north-east winds).

A unique solar chimney built into the north façade actively enables warm-air evacuation from the dwelling. In lieu of a vertical section, the upper section is bent in accordance with the sloped roof, thus avoiding shading on the polycrystalline solar panels integrated into the roof.

The external section of the solar chimney is covered with a glass panel, used to heat the upper section of the house, thus accelerating natural ventilation and circulation of warm air toward the exterior of the house.





ÉQUIPE Unicode de Taiwan

PROJET Orchid House

NEW HOUSING TYPOLOGIES

Building on top & density

«A sustainable living space harmonized with nature on top of Taipei's towers»

The Taiwanese capital, Taipei, has experienced very rapid development, resulting in uncomfortable neighborhoods, weakened by heat and humidity. The cornerstone of the Orchid House project is to remedy these conditions by creating a series of rooftop extensions for existing buildings. As an experimental platform, the project is using a cluster of buildings from the Ximending neighborhood.

The objective for the house extensions is to use the broad sloped rooftop surfaces to collect rainwater and flow this into reservoirs. Covered with photovoltaic panels, these rooftops will contribute to further urban energy independence and, in the long run, improve air quality in combination with 2-wheel electric vehicles, the transportation mode of tomorrow's Taipei.

In order to rejuvenate neighborhoods, Orchid House will maintain and dedicate 15 % surface space to vegetation. The extensions will reveal one of the three common dominant forms found in Taipei: L, C or I forms.

The prototype presented in Versailles will be based on the L shape, forming a large terrace space for vegetation. Twenty polycrystalline solar panels are integrated into the southern sloped section of the roof.

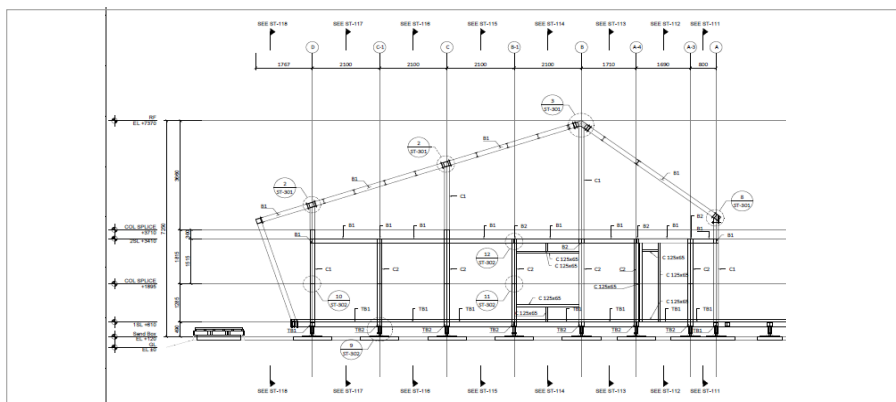
These are linked to the grid to power the building while charging a 5,7 kWh capacity battery-bloc.

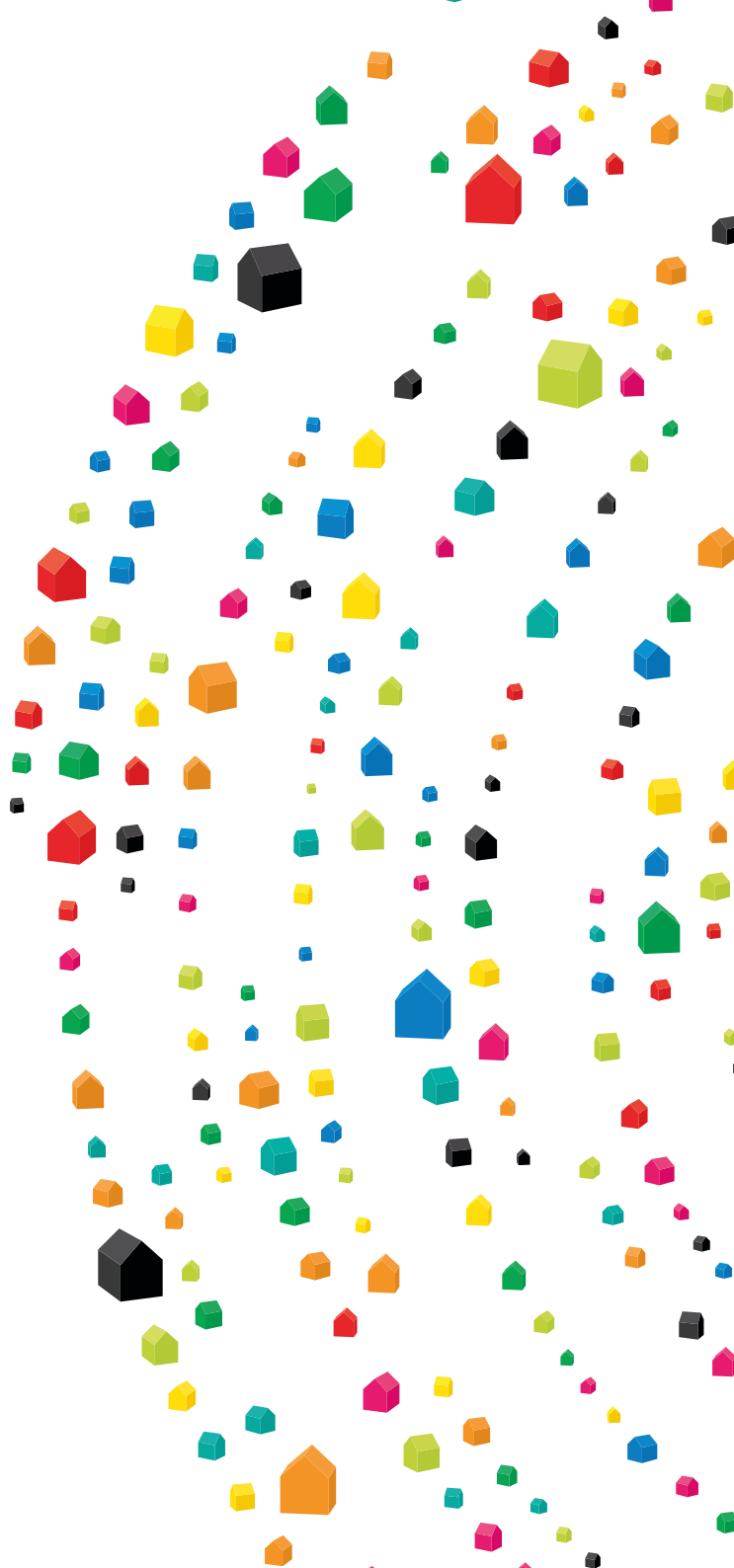
These batteries are devised for maximum autonomy from the grid, specifically through evening consumption and usage.

To this day, very few residential buildings in Taiwan use photovoltaic modules.



<http://www://sde.tw/>





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