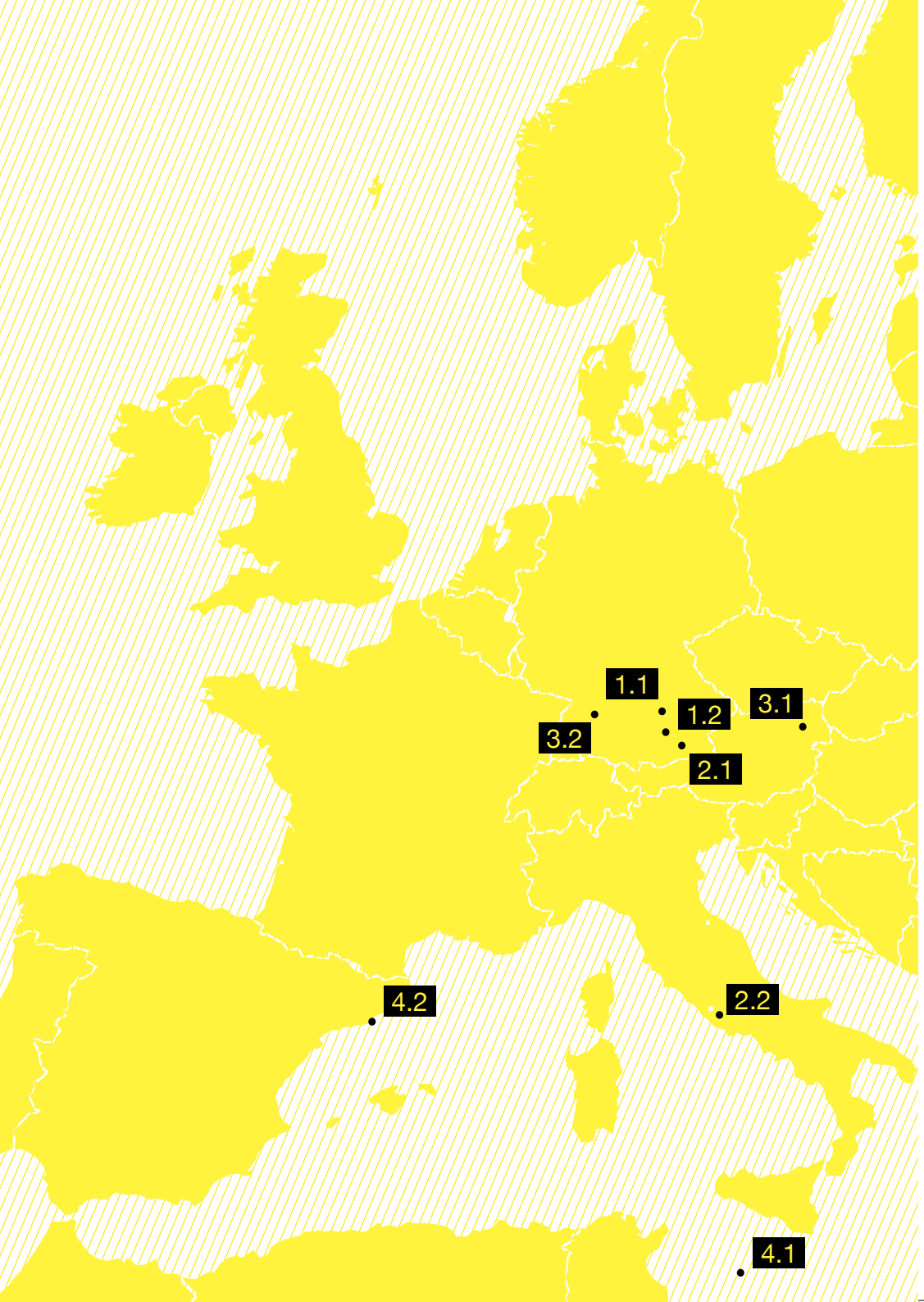
TRANSFORMING BUILT ENVIRONMENTS

Addressing Resource Awareness in Architectural Design Pedagogy

Thomas Auer
Daniele Santucci
(Eds.)



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CONTENT

PREMISE

Thomas Auer, Daniele Santucci

Climate change, urban population growth and resource shortages are the most crucial issues of our time. In this context, availability, distribution and the adequate management of resources are the fundamental issues that need to be addressed in design disciplines. Furthermore, today, employing data that is continuously recorded and shared through digital media allows facilitating and amplifying these aims. The amount of information at our disposal is enormous, and its correct use is fundamental to creating quality spaces when transforming and conserving our built environment: architects and urban planners are asked to improve the quality through design and planning approaches, which create strong synergies with the context and the available resources.
This transition requires new strategies in architecture pedagogy to be able to understand these challenges and adapt them to human needs, by synthesizing information and transforming it into the physical form.
Architects are responsible for activating a stimulation process that generates ideas and proposals that inform the built environment at multiple scales and with different temporal effects. As well as dealing with resource awareness and environmental qualities, the narrative element assumes a relevant role in a negotiation process that includes existing social, cultural and economic issues.
This book collects a synthesis of our five years' experience, which ultimately aims to spur a stronger discussion about the transformation processes that occur in cities, and how architects can contribute to a more favorable evolution of our environment.
Over three years, around 200 architecture students from more than 60 different countries were presented with the question: how can the quality of the built environment inform the future of cities?
The challenge for the eight design studios was to deal with different urban contexts at different scales, with the common objective of shaping the transformation process in a dialectic manner. Visiting professors co-tutored some of the studios being involved in the topic definition.

In the first phase, students focused on specific research topics with the aim of generating a common database to be used and shared for the design process. During the semester, a number of excursions took us to different sites where we were able to experience first hand best practice in implemented projects.
The design proposals shown in this book are a selection of the over 50 that were created. Thanks to the diverse composition of the design teams, their backgrounds and the experimental approach they showed, the results present a large variety of solutions generated upon a research methodology.
The most relevant challenge for us, was to demonstrate how the educational process, both for the teachers as well as for the students, can define how design, inclusion and new technologies inspire architectural training in the future considering humans the inseparable dimension of design.

DISRUPTIVE TECHNOLOGIES IN ARCHITECTURAL EDUCATION

Alessandro Melis

Many schools of architecture studios are traditionally oriented to the professional practice. However, this has changed somewhat in the past few decades: research has become a relevant component of the didactic activity, while the global crisis, alongside climate change and the consequent social pressures, suggest that the transformation of the human habitat is occurring faster than expected. As a result, conventional approaches may not be sufficient to meet the needs of future generations – therefore, a more radical and explorative approach in design teaching becomes more relevant.
The aforementioned conditions lead us to some critical questions: Is the current building market responding positively to the shifting paradigms of architecture? If not, is the teaching of current professional practice good enough to prepare students to drive the market, and not just passively react to the market?
A positive response to those questions clearly depends on the capabilities of architecture teachers to provide students with a vision of future societies' needs, rather than simply transferring professional skills at a more pragmatic level.
Hence, it is crucial to develop a pedagogic model oriented to transfer innovation knowledge, which, in the field of design, focuses on the technology and the environmental design practices.
Over the past ten academic years, the authors of this book have developed and carried out several programmes oriented to reinforce the radical approach. They have included lectures on the roots of radical approach to design, and how this can be adapted to the environmental design through the introduction of 'disruptive' case studies, as well as advanced digital tools for climate responsiveness.
'Disruptiveness' does not necessarily mean advanced technology, but, rather, the unconventional use of technology. Accordingly with the ap-

[1] HELIOPOLIS 21 & ARXX, STELLA MARIS INSTITUTE, PISA (2016-2020)

proach aimed at innovation, the disruptive technologies were presented to students as the emerging innovation in the field.

This book aims to examine the aforementioned experiences recorded by both academics and the practitioners involved in architecture education.

The chapters will focus on the integration between design and technology in architecture studios, on teaching methodologies, and on the use of case studies within courses.

A vast amount of literature shows how live studio projects, in architecture schools, have proved to be essential tools for increasing students' awareness of the need for integration between innovation, design, technology and professional practice. The teaching of technology in architecture courses equally makes an extensive use of case studies and precedents, with the aim of narrowing the gap between theory and studio activity. The approach to technology, therefore, which aims to emphasize the need for an architecture capable of directing the construction market, rather than following it passively, should therefore be based on research-based case studies. The majority of the authors involved in this text will try to analyze some of the features of the projects as potential case studies. Therefore, the projects have been selected on their effectiveness in achieving this goal, as demonstrated by students' feedback.

Within this teaching context, the interests in 'disruptive' aspects of architectural technology were multiple, including:

– Capture the students' attention, often challenged by the complexity and, for some, by the dryness of technology, through a more inspiring approach that supports excellence and innovation;

– Deliver a practice knowledge that can facilitate the employability of students in the medium term, while considering future changes in construction technology;

– Develop a level of criticism, in order to maximize the opportunities of achieving a leadership position in the professional practice.

1 ADAPTABILITY

[2] METROPOL PARASOL // DAVID FRANCK

A PLACE IN THE SUN

Jürgen Mayer H.

Living in the park, mono-function and car-oriented traffic planning are key facets of the post-war urban vision in Germany: these kinds of quarters exist everywhere in the central areas of German cities. At that time, the need for daylight, air and free space is comprehensible. Recent concepts such as densification, environmental consciousness, mixed functional use and new living and mobility concepts, show how deep the expectations (idea, vision, concept) around a vibrant and liveable city have changed.

The Pius-quarter in Ingolstadt is a typical post-war settlement with different typologies. The older part has a structured and loosened character, with four-to-five-storey terraced buildings from the 1950s and 1960s. The following construction phase shows a strong paradigm shift that aims to achieve urbanity through density. This phase is characterized by taller buildings with a higher density, maintaining a continuous scenic open space. Both cases represent ‚landscape urbanism'.The existing Pius-quarter in Ingolstadt is a mono-functional used quarter and is considered a social flashpoint.

The sun is the core of the project's study. Although it is essential for energy and a source of vitamin D for people, it can also cause UV-damage and overheating problems in our buildings and urban spaces. Ultimately, the sun defines the orientation of our living spaces and how we shade them.

Both on a personal level as well as in buildings, the relation between light and shadow is something that is defined but that also can be continuously changed; it can be manipulated and tuned.

The transformation of the Pius-quarter considers relevant aspects in terms of sustainability and looks at the climate responsive city. Minimal

soil sealing and the conservation of green areas can bring satisfactory climatic conditions, by creating green corridors to connect the urban texture to the landscape, as well as protecting natural habitats.

The existing buildings that can be retrofitted with simple measures, as well as being adapted to more adequate floor-plans, create a large amount of affordable living space. The poor building quality has determined a lower occupancy density and a partial utilization, compared to the 1950s and 1960s. The renovations seem cost intensive, in particular if related to the poor building quality.

In this context, the level of retrofitting intervention to create new living spaces is the main question: to obtain a level of quality that corresponds to the social needs and to the real estate market. A complete renovation would be uneconomic, especially in relation to the banality of the building stock, would result in the total gentrification of the area.

This framework indicates the necessity of balancing the ecological and environmental aspects of sustainability with the socio-economical ones, to gain thought-provoking arrangements to be considered in future scenarios.

Due to its low building density and to its proximity to a major car manufacturer's headquarters and factory, the quarter has the potential to be developed as a sustainable urban model and as a carbon neutral neighborhood.

Aspects such as renewable power generation, new mobility concepts, and comfortable microclimates are fundamental elements of a multi-functional quarter. Alongside a variety of living forms (co-housing, single units, families, etc.), commercial activities, cultural and shared uses should be integrated.

Through this, the quarter would lose its original limited multi-functionality through new functions, and, through the Leitmotiv of the sun and its multiple significances, it would achieve a high level of attractiveness and vitality.

In a first research phase, the sun was analyzed in multiple aspects that were set as a Leitmotiv for the project. After visiting the quarter, concepts for the transformation were developed and presented. Based on those, in a successive phase, the scenarios were run through and represented into projects.

The strong conceptual approach aims to create highly attractive environments out of the anonymous neighborhoods, combining aesthetic appeal with an inclusive city where citizens have access to education, healthcare, culture and healthy and safe environments, besides technological features.

The Pius Plus project aims to present design proposals for a qualitative densification from differing points of view: an effective use of surfaces and resources, a balanced functional mix, efficient mobility concepts to mitigate the peaks in the electric grid, a comfortable urban climate and a future-oriented social structure. Through these interventions, the Pius quarter could develop as an urban system and be upgraded to fulfill the goal of a carbon neutral quarter.


1.1 PIUS PLUS

SUN AND NATURE

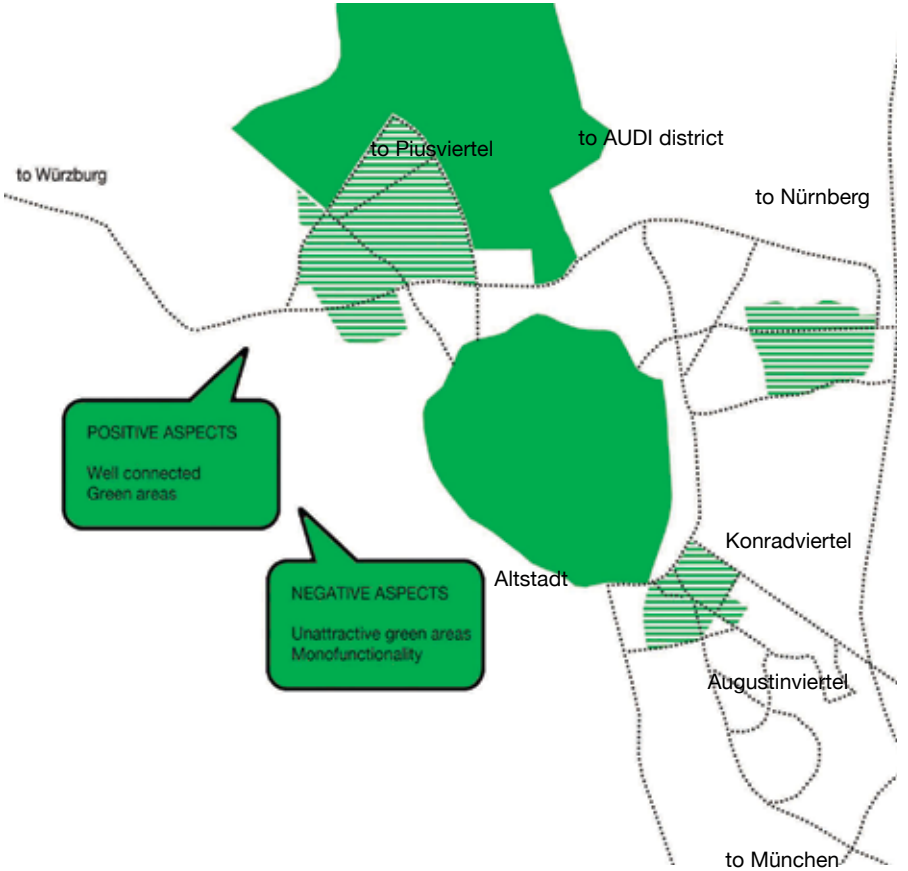
CONTEXT

SUN AND NATURE

CONTEXT

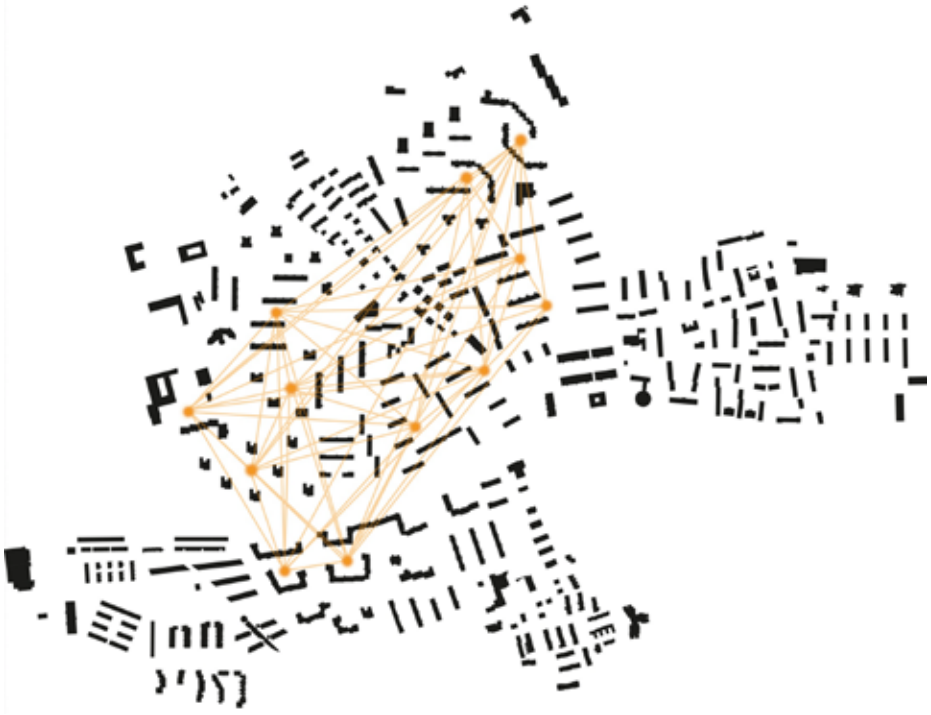
Solar radiation and daylight hours
summer solistice

Solar radiation and daylight hours
winter solistice



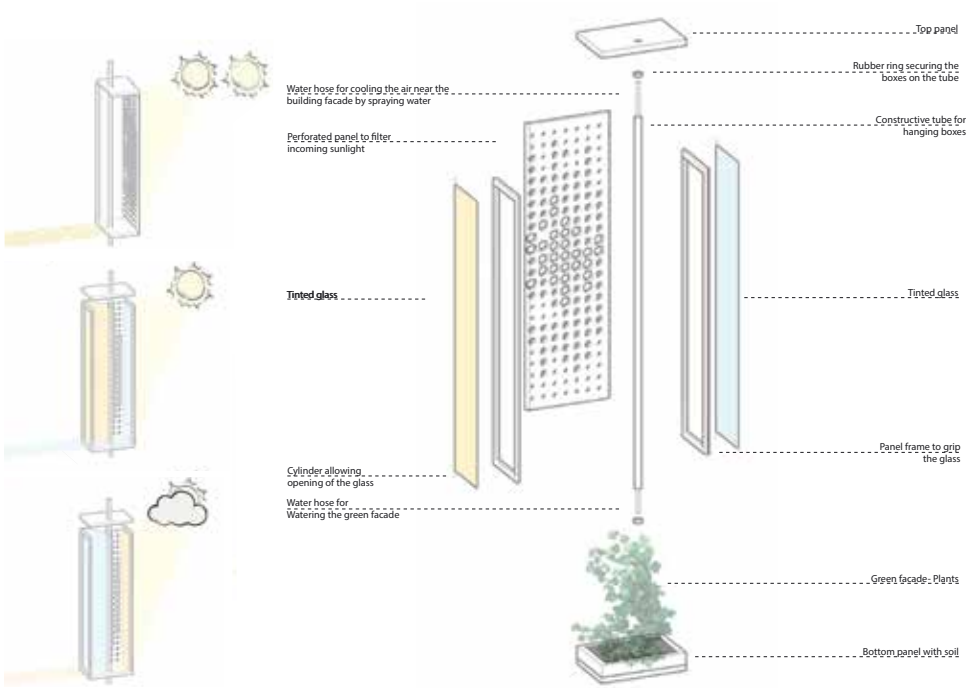
PIUS PLUS

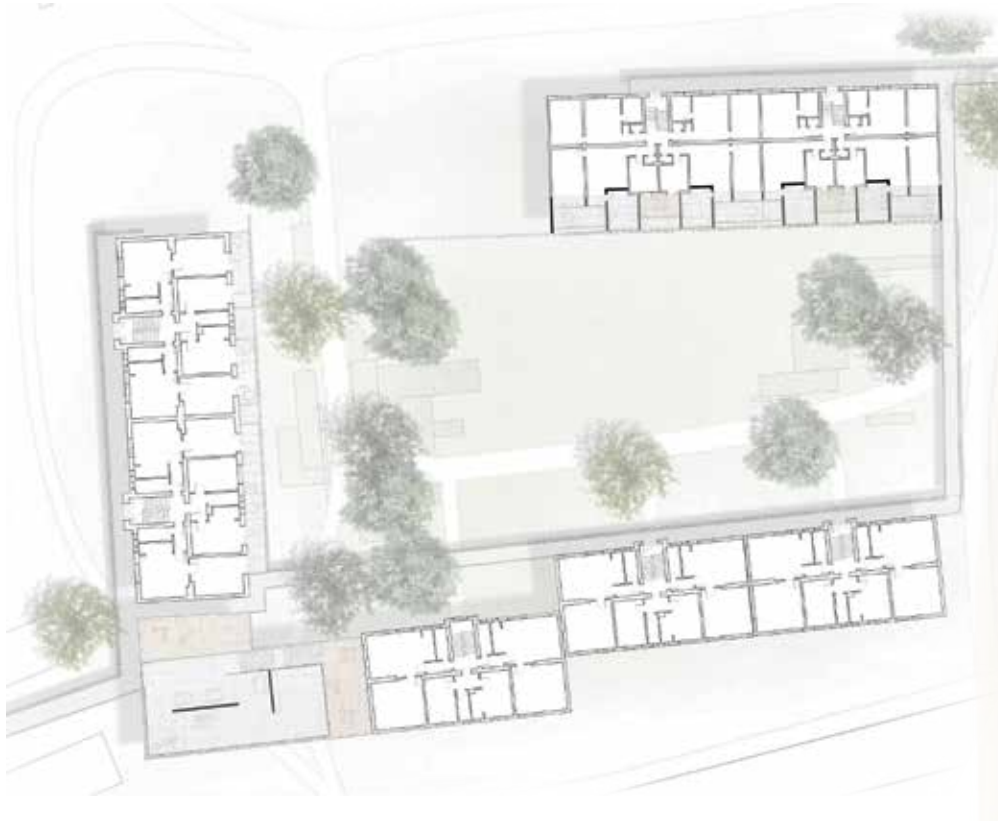
CHRISTINA DENZ
MARIA MAIER



PIUS PLUS

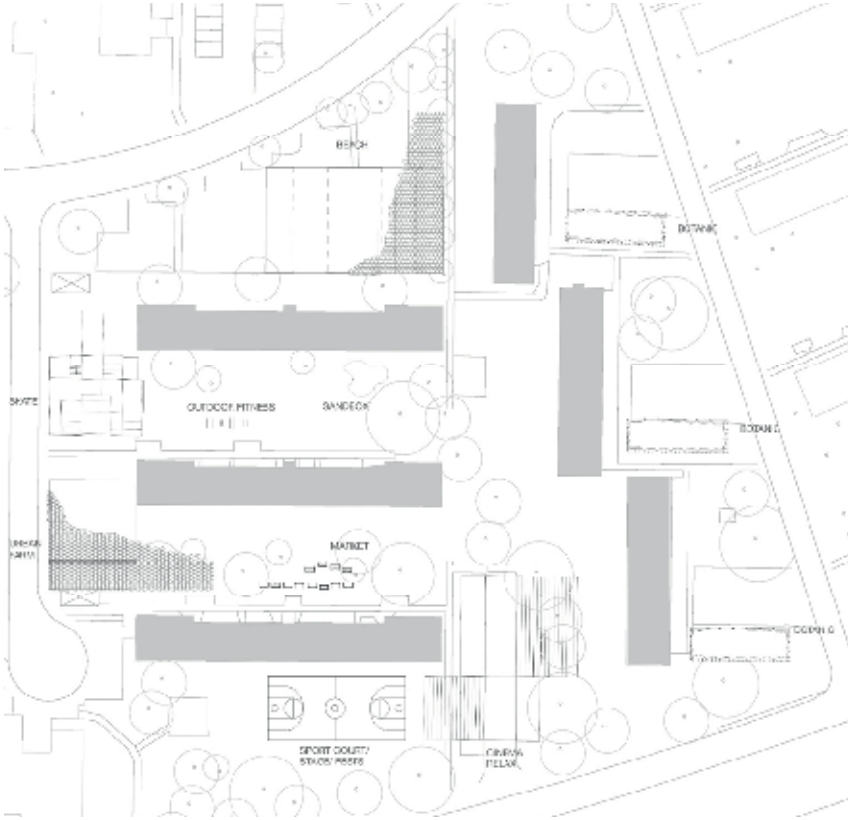
NOA GANTZ
STEFANIE LUTZ

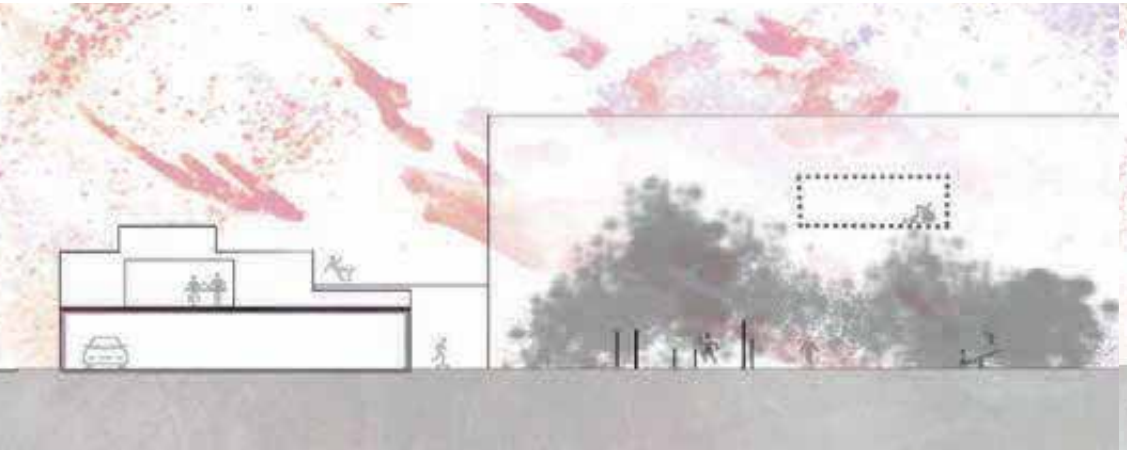


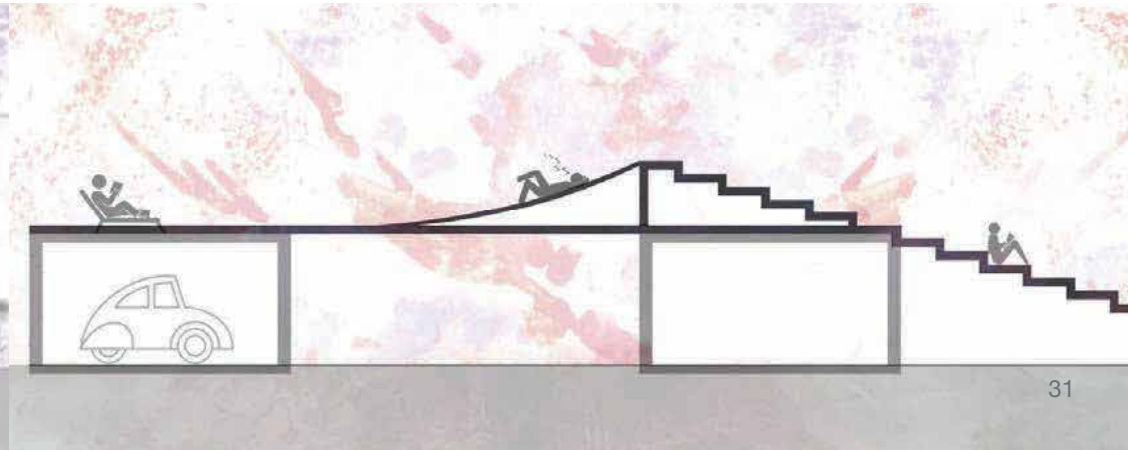


GARAGE CITY

ANNA HERTEL

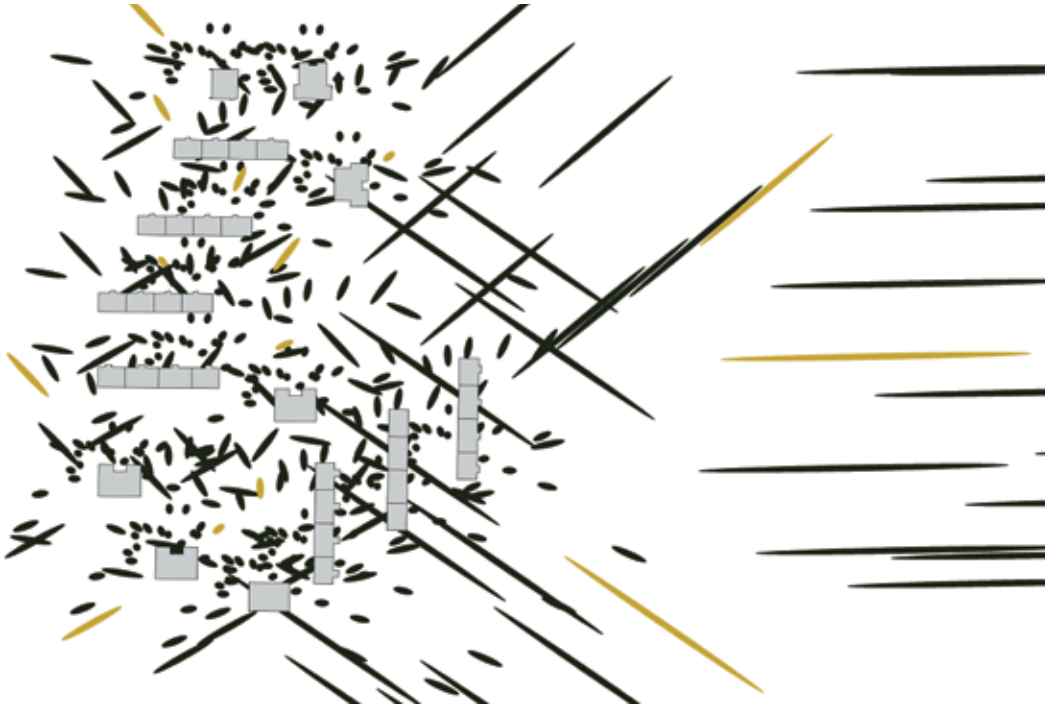


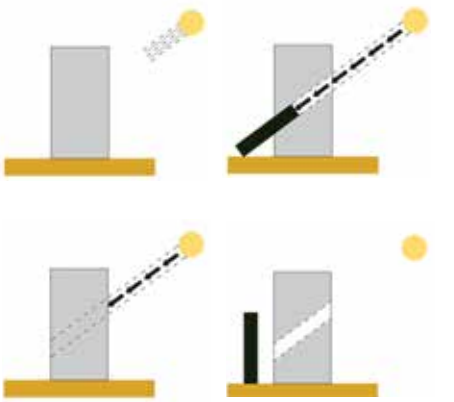




SUN HOLE

SIMONE GASPARRINI





[3] WATERTOWER // MARKUS HEINSDORFF

MORE WITH LESS

Daniele Santucci

In recent decades, energy efficiency has been considered the main factor to achieve carbon neutrality. Both on new as well as on retrofitted buildings, the quantification of energy demand has been used as the key to evaluating sustainability. Even in international certification systems, the evaluation of sustainability levels is largely based on the criterion of efficiency. In Europe, although a considerable number of existing buildings have been refurbished to reduce their energy demand, a significant overall reduction of carbon emissions has not yet been observed. One reason for this phenomenon is the increase in the individual living space that has occurred in western countries. Dwindling fossil energy sources, the need to reduce CO_2 emissions, as well as a growing environmental and sustainability awareness in our society, have set new challenges for the construction industry. Legal requirements, energy saving regulations and certifications necessitate a rethinking of design and planning processes. Control tools such as energy performance certificates for buildings, or incentives to meet improved energy standards, are established during the planning and implementation phases.

Since higher energy efficiency in buildings does not necessarily relate to lower emissions, to achieve a significant reduction in CO_2 emissions in the built environment, it is imperative to reconsider the rising demand for living space and their related requirements. The improvement of energy efficiency in buildings should be combined with appropriate responses to the social issues of our time.

In order to get closer to the targets of the energy transition in Germany, which is based on abandoning nuclear power by 2022 and using 80% renewable energy sources by 2050, it will be necessary to reconsider the methods for quantifying energy efficiency. In fact, considering that operational energy demand for buildings has not yet led to an overall reduction of carbon emissions, other evaluation methods need to be identified.

In 1998, researchers of the Swiss Federal Institute of Technology (ETH-Eidgenössische Technische Hochschule Zürich) introduced the vision of the '2,000-Watt society' to represent a goal in terms of energy demand: over the course of a year no one in western countries should exceed 2,000 Watts of continuous power demand including, e.g. operational energy for living, mobility, nutrition, infrastructure, etc. This value is the threshold of the world average rate of total energy use and approximately corresponds to consumption in Europe in the 1960s. Nowadays, the average demand of a European citizen is three times as much: roughly 6,000 Watts. The most effective way to reduce demand and consequently emissions is to reduce our impact. In a word: sufficiency. Sufficiency, a term which is rarely used, and whose significance is not unambiguous, defines what is enough. In ecology, the term sufficiency (from lat. sufficere, to suffice) means the aim to reduce negative environmental consequences through a reduction of the demand for consumer goods.
While efficiency, which has an analytical character, is used to evaluate a wide range of cases and processes, sufficiency represents a rather unsystematic and seldom-used alternative for a qualitative evaluation. Although sufficiency cannot be classified as a scientific quantitative evaluation system, it should not be neglected when formulating design and planning proposals as the careful management of resources is the issue of our future. In this context, models based on sufficiency offer the opportunity to focus on the quality of our built environment and of our living spaces. Sufficiency in buildings means reducing individual space and creating common areas for shared activities, balancing strictly private sectors with shared spaces for semi-private activities. Built surfaces as well as public spaces are considered fundamental resources. In a framework where the effectiveness in using resources appears to be the basic parameter for evaluating sustainability, sufficiency seems to be strongly related to a future-oriented – sustainable – model.
Another basic issue to be reconsidered are indoor comfort conditions. Increasing comfort requirements have given rise to a strong improvement in the building envelope in terms of building physics to obtain better indoor comfort conditions with a lower energy demand. These targets are reasonable in new buildings, when the planning process includes them in the early phase. Dealing with the built environment, especially in the case of social residential buildings built during the second half of the 20th century, requires a different approach. All evaluation systems based on the energy balance define certain temperatures as a basic condition for the living space within the thermal skin of buildings. This criterion leads to an incorrect evaluation of existing buildings. Most evaluation processes for residential buildings consider all built space as a homogeneous zone with the same comfort requirements.

In contrast to the common approach, which places the highest priority on thermally insulating the building envelope and new installations to reduce demand and emissions, the Hyperaubing project's main task is to rethink living spaces in post-war residential complexes. Instead of adapting existing buildings to given functions, the capacity of buildings is the driver for transformation. Nevertheless, as the building stock determines the identity and the building culture of our cities, considering its conservation and transformation is a high priority. Reducing energy demand while increasing architectural quality seems to be the strongest motivator for refurbishing the stock.

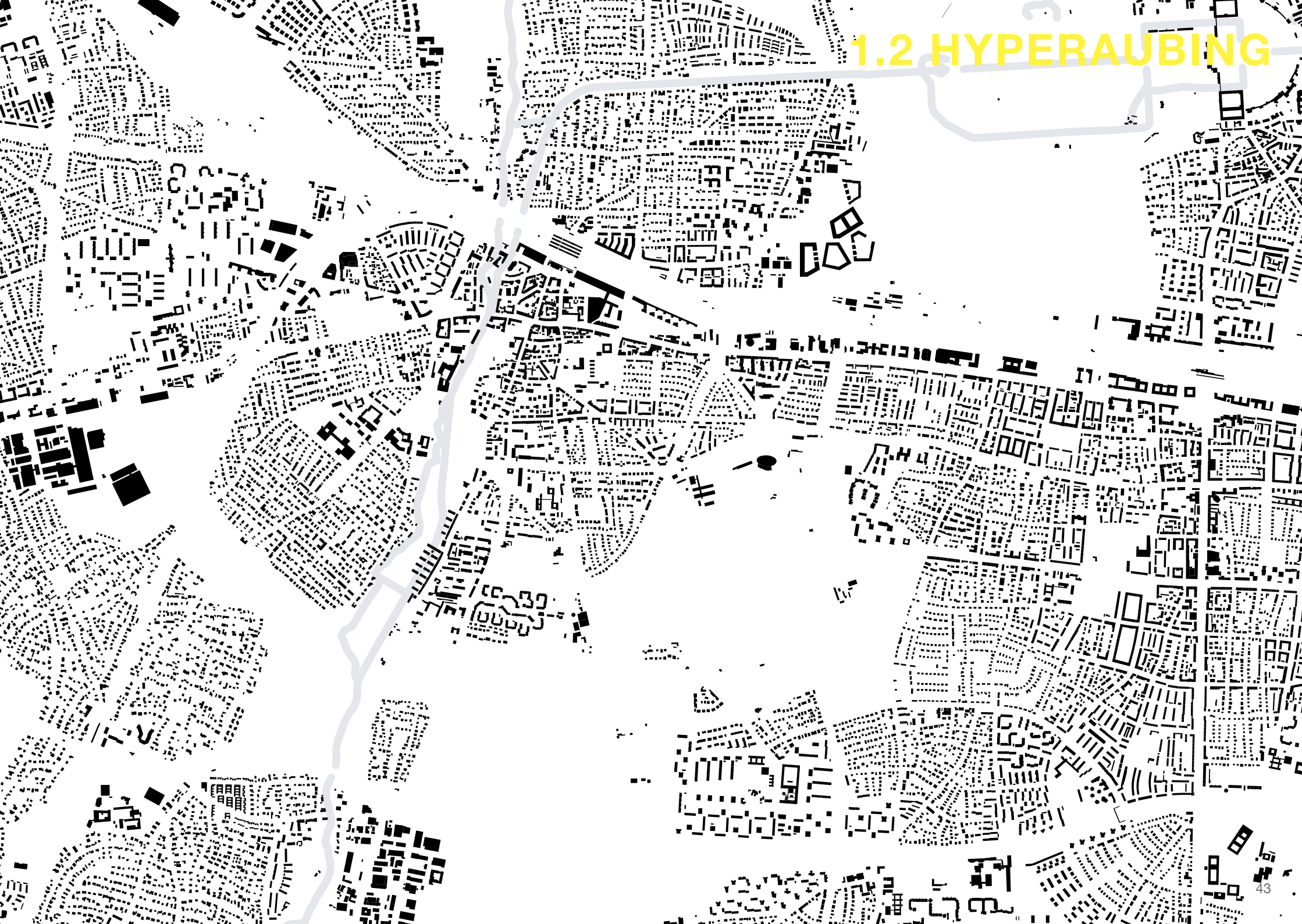
Integrating new functions and different climate zones in existing buildings create synergies between spaces and energy flows. The so-called functional mix presents the opportunity to experiment with combinations of different energy demands, in terms of temporal availability, energy sources and temperature levels. Based on this assumption the building has to be considered one element of a complex system and the 'smart grid' is one of its levels. Buildings are adaptable elements in relation to the city, or, more generally, to the context in which they are situated. It seems necessary therefore to create a vision that incorporates the building in the context of the city and in the relationships it imposes. In fact, the city offers a wide range of systems, structures and alternating demands which can and must be linked and shared.

The target should be shifted from achieving absolute values of energy efficiency for individual buildings, the current practice supported by existing legislation, to identifying measures and interventions with a high degree of accuracy.
This method delineates a transformation strategy that does not deeply intervene in existing structures. The building stock is considered an embodied energy store that is worth keeping. Interventions are planned to assure accessibility, to better adapt to contemporary living standards and to enhance comfort conditions by adding new layers, which include new functions and optimize the envelope in terms of building physics. But the main structures are kept and each proposed measure is evaluated with regard to its impact on the amount of embodied energy. The aim of this approach is to consider embodied energy as a main factor to determine the level of sustainability for the intervention. As in European countries, the energy production from renewables is gradually increasing, the primary energy factors will decrease in the next few decades, leading to a different ratio between operational and embodied energy. The influence of embodied energy, both for new and existing buildings, will play a major role in achieving carbon neutrality.

Based on the above criteria, solutions were tested on a 1960s social housing complex in Neuaubing, Munich. Besides their peripheral locations, these areas have a strong potential for the future development of cities, due to their concealed qualities: low density of urban structures, large-scale green areas, affordable prices, and good connections to the city centre via the public transportation network. The proposals formulate strategies and models to refurbish and maintain the existing buildings, and, simultaneously, to develop innovative living models. Existing criteria defined by norms and regulations, such as homogeneous comfort conditions for the entire living space and building physics requirements for the envelope, were questioned and debated using exemplary alternative approaches.
Buildings were transformed through extensions, redefining proportions between collective and individual spaces and considering flexibility in floor plans as the main response to the rapidly changing needs in our contemporary society. Introducing new functions leads to a greater variety in quarters where mono-function has influenced the way of living, leading to increased attractiveness. The ‚Hyperaubing' projects increased density from the current approximately 40m²/person, to roughly 20m²/person, including the additions to existing buildings that were designed to generate common spaces and to achieve higher energy standards through passive systems. The use of advanced building installations, combined with renewable energy sources, leads to synergetic effects between the improved existing buildings and the new spaces.
Keywords such as densification, environmental awareness, and new mixed-use residential and mobility concepts show how far the idea of a lively and liveable city has changed in the past 50 years. Based on the objectives of CO_2 neutrality and a careful use of resources, we identified and developed models which included the structural transformation of society and the notion of ‚sufficiency'. Efficient floor plans in refurbished buildings enable generating a large amount of low-cost and affordable housing with minimal transformation measures. Aspects of energy efficiency and ecological effectiveness were combined with economic and social issues, to guarantee a valid model for sustainable intervention. The level of intervention and the transformation measures for housing is a fundamental question for upgrading building stock in a socially acceptable way, while also being compatible with the real estate market.
The ‘Hyperaubing’ project shows the possible scenarios for upgrading the existing building stock. Transforming existing buildings also positively affects the urban space: inserting new functions and actors activates new flows. To diffuse similar models, it is necessary to work on simple buildings that can be easily transformed. In fact, flexibility in use assures a higher level of adaptation, especially when considering unpredictable future scenarios. Increasing requirements on user comfort, acoustics and thermal insulation and the related legal restraints have led to increasingly complex constructions and building systems. The consequences are increasing costs, higher error-rates in planning and building processes and complicated use.

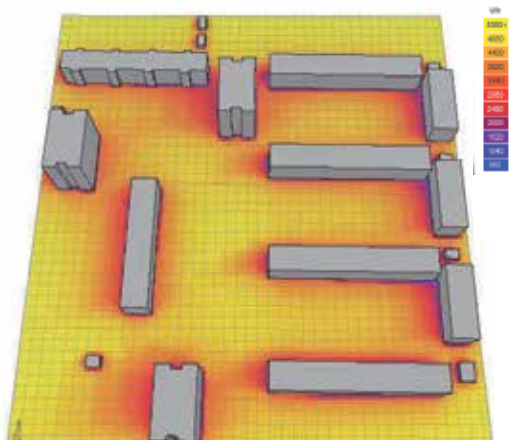
Stronger adaptation capabilities to local climatic conditions through effective passive measures, as well as the implementation of functional requirements using simple constructions and practicing an efficient use of materials and energetic resources, can be the key to assuring longer lifecycles for buildings. Innovation can be attained through reduction. Simplifying construction and building installations and their connection with the constructional understanding of building culture could be an approach to reaching this aim. The focus of the strategy is on the use of local materials, simplified building elements and the reduced use of installations. Furthermore, data records can assure an additional optimization, both for consumption and comfort conditions. Through prediction and shared information, energy flows can be distributed in a more effective way. To reach the targets of the energy revolution in Germany, as well as those of the Kyoto Protocol for other countries, and to react to the consequences of the climate change, the increase in quality and attractiveness of our built environment is supposed to be the most effective measure. The key to a significant reduction of CO_2 emissions and a major factor for creating a sustainable model for our cities is therefore to provide a high level of quality for the built environment and the public space. Because finally, in the debate about quality of life, the main issue is the necessary amount of resources. Sufficiency means more quality, with less expenditure of resources.

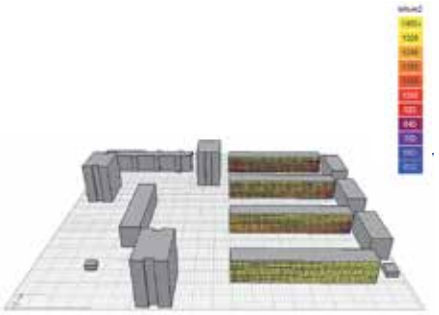
1.2 HYPERAUBING

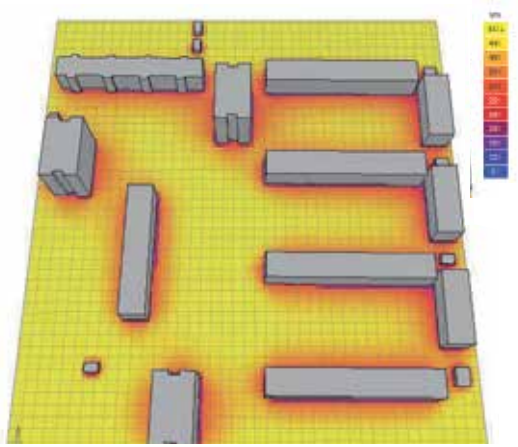


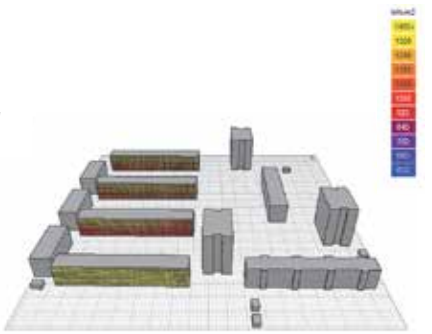
SOLAR ANALYSIS

CONTEXT



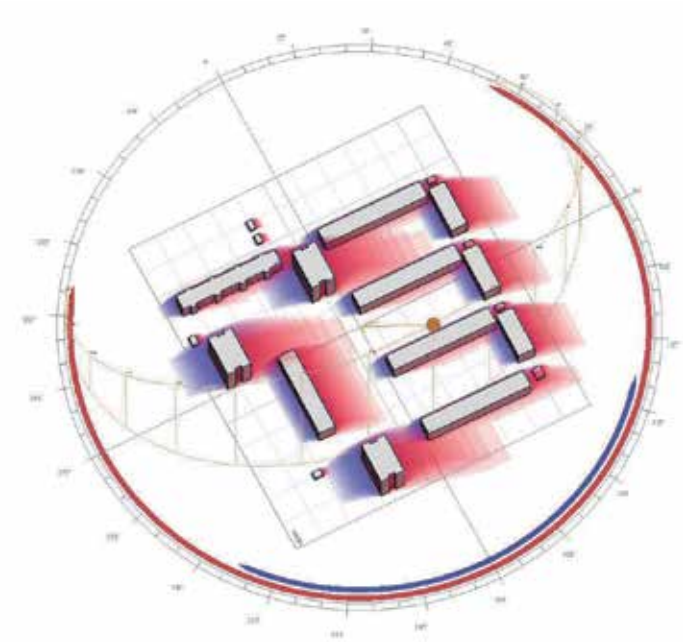




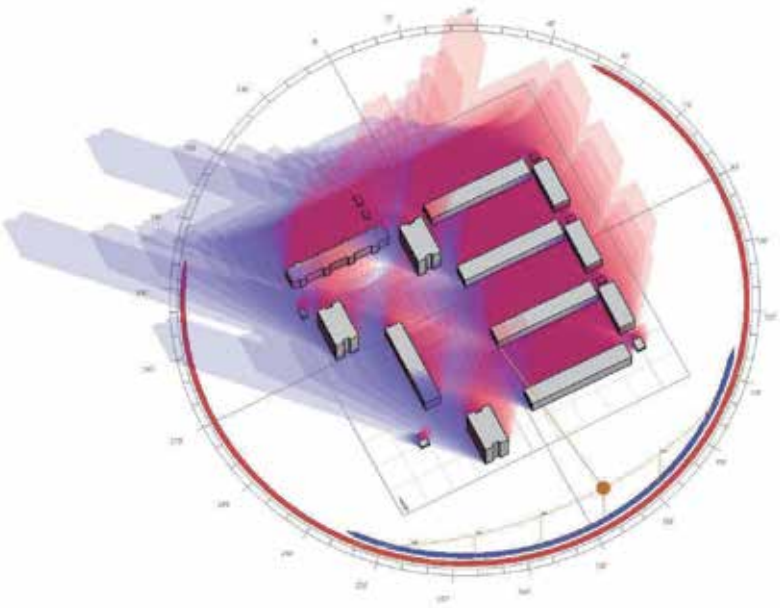


SOLAR ANALYSIS

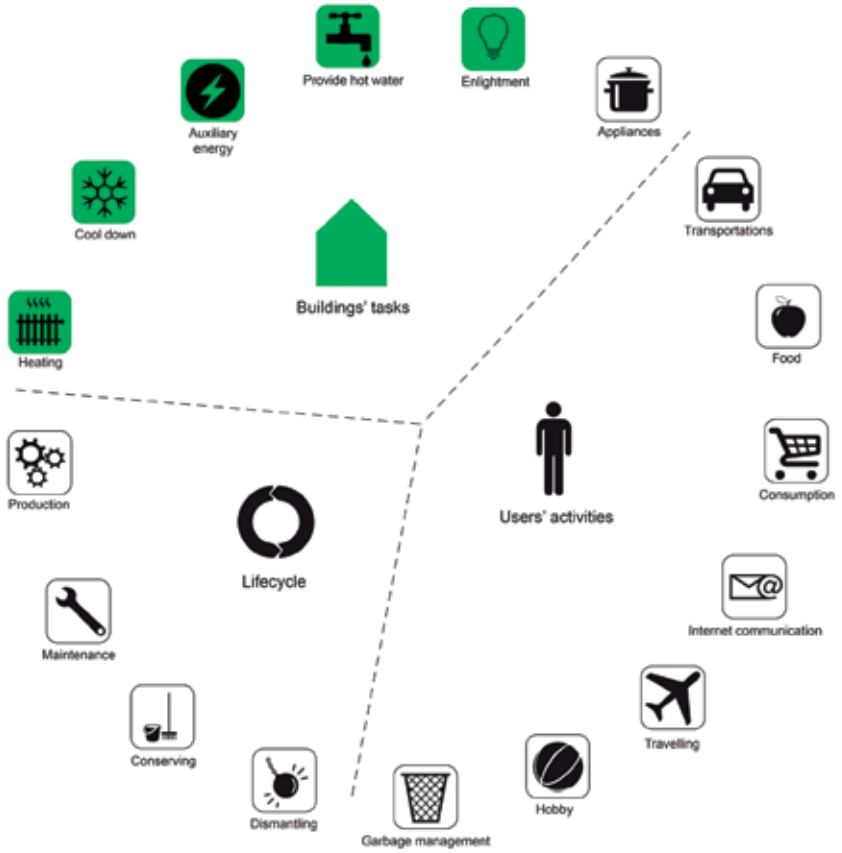
CONTEXT



Course of sun on june 21.

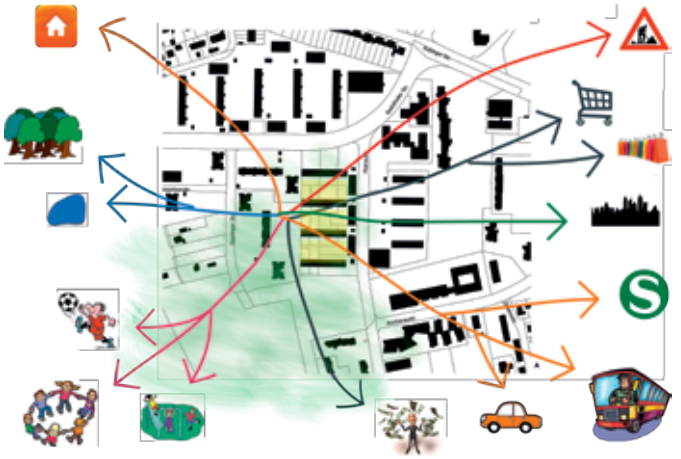


Course of sun on december 21.

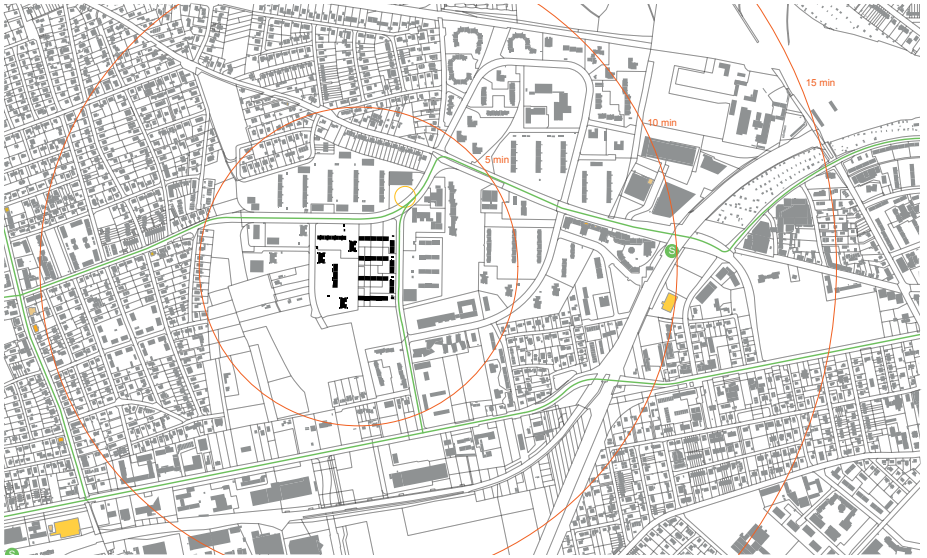

Provide hot water
Enlightment
Auxiliary energy
Appliances
Cool down
Transportations
Buildings' tasks
Heating
Food
Production
Users' activities
Consumption
Lifecycle
Internet communication
Maintenance
Travelling
Conserving
Hobby
Dismantling
Garbage management

ACCESSIBILITY

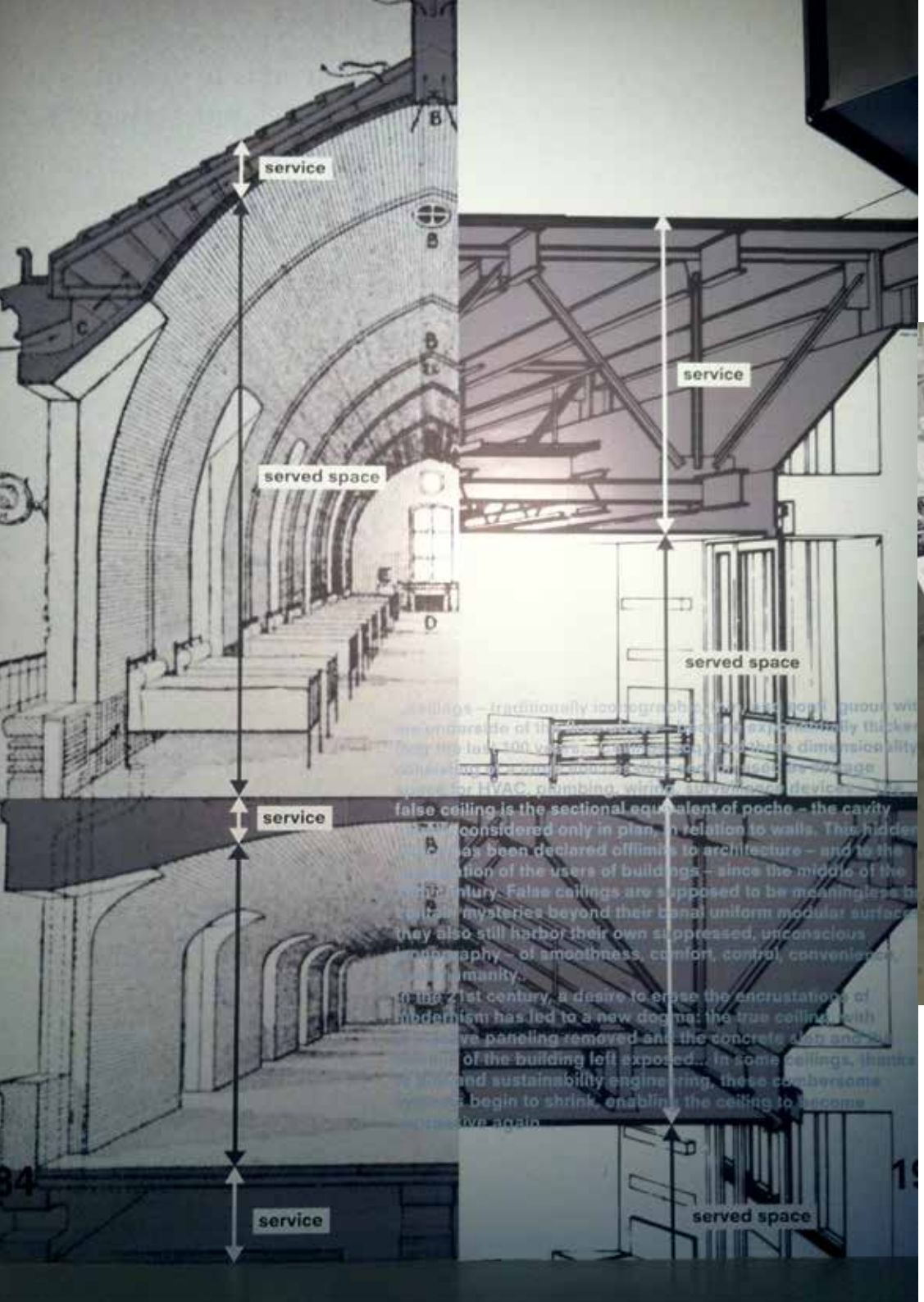
CONTEXT



Accessibility - activities



Accessibility - food security


service
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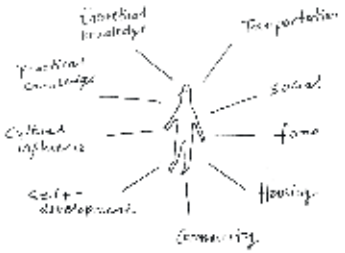
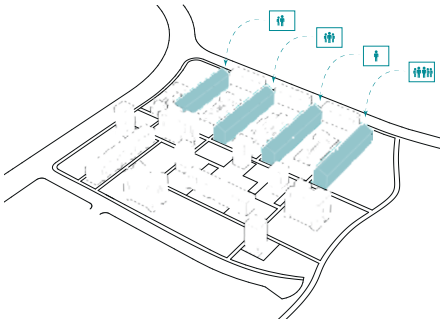
1954

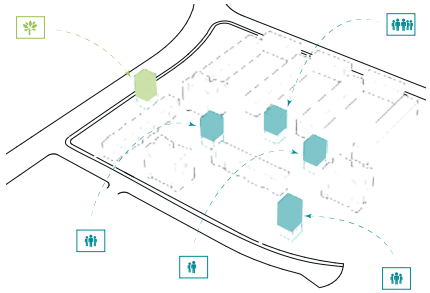

2003
1-06

INDIVIDUALISM VS. COLLECTIVE

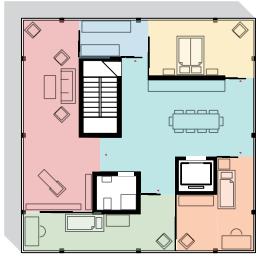
CATHRINE FINNEMA
FLORIAN KORNBERGER
DAVID SELJE







Flat-sharing



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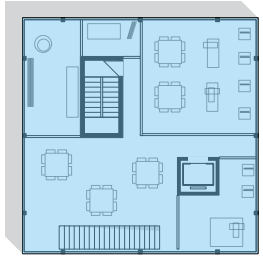

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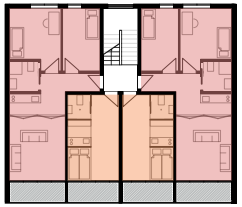
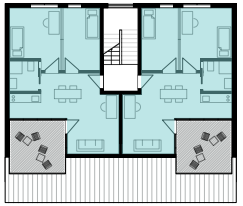
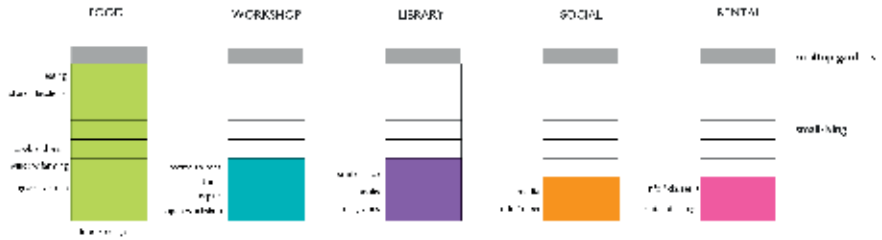
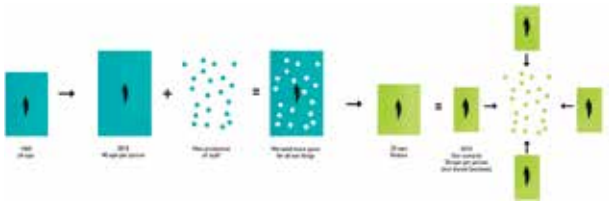
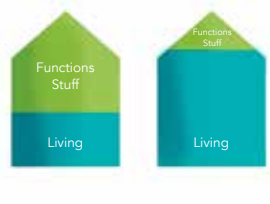
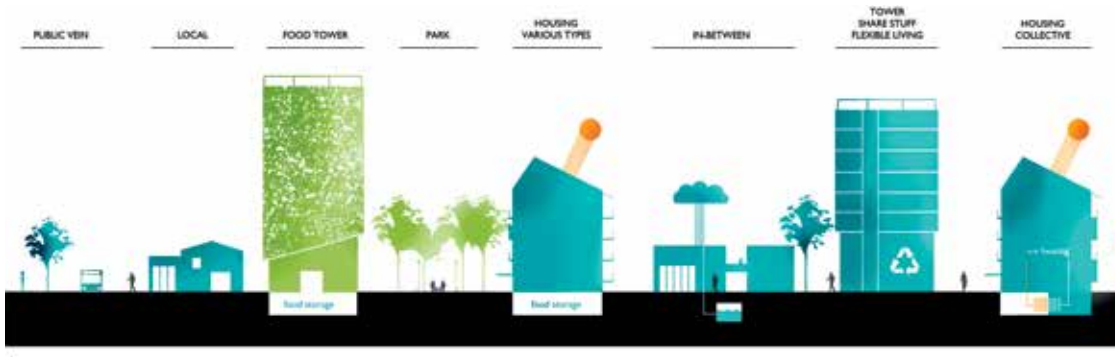






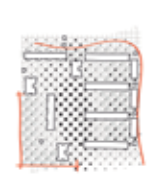




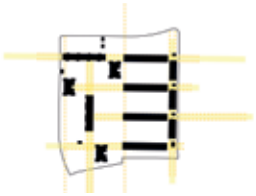


HYPERAUBING

PAVLOS ANTONIOU
ANNA OCHWAT
GRZEGORZ SCHNOTALE



Public / private



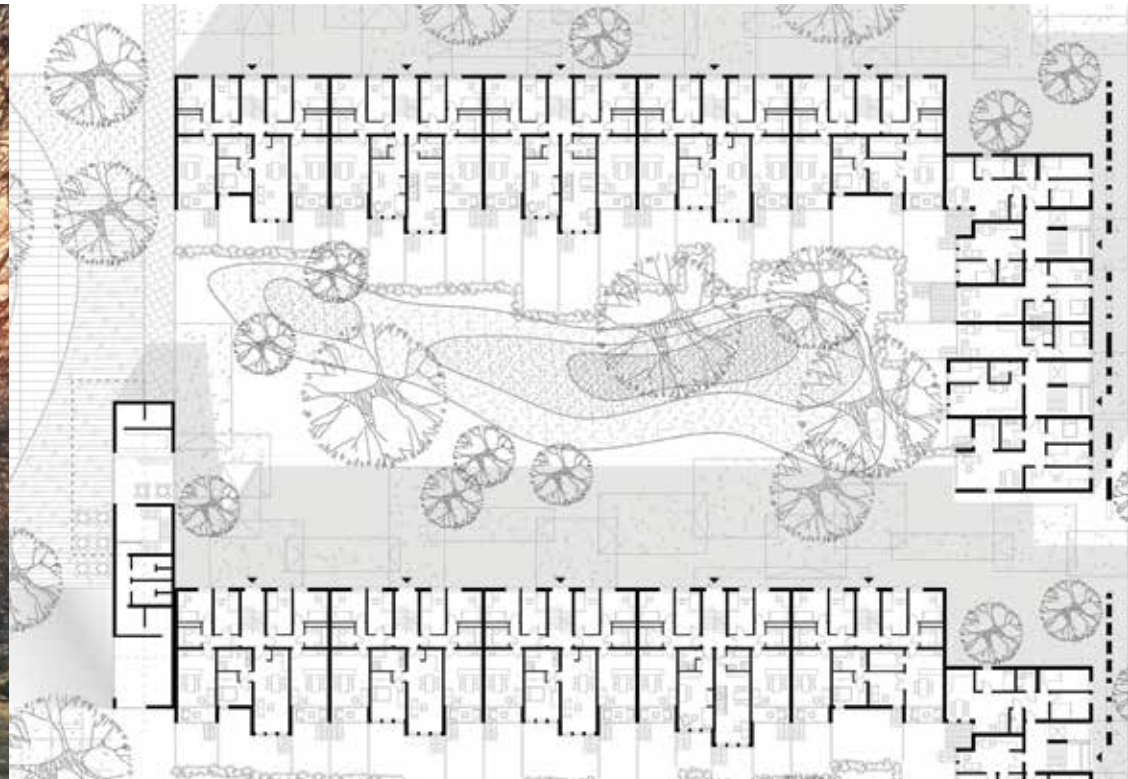
Grid system

Circulation

Concept

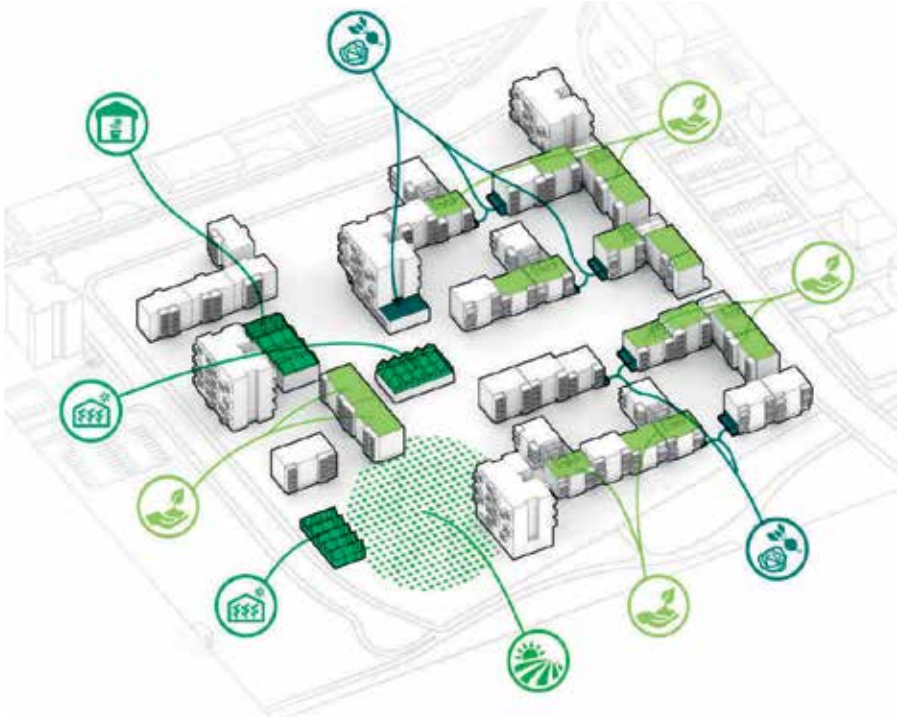
Bogenhausen

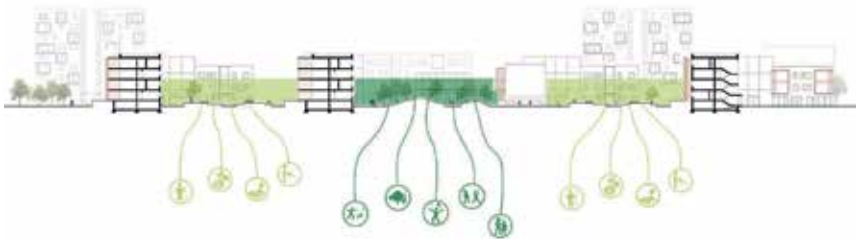
Schwabing



VERZAHNUNG

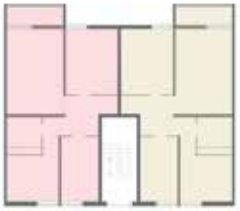
ANNA-LEA BOÉ
SARAH DIELENSCHNEIDER
EDUARD MILDENBERGER





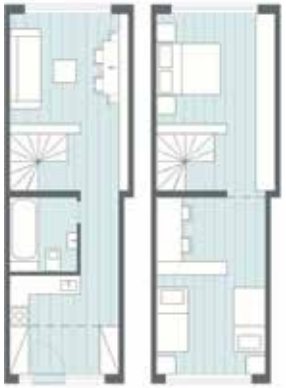
STORIES OF NEUAUBING

ASTRID GUIZZARDI
LINDA SIRANOVA
JAN URBAN



Future situation

68m², for family
with 2 children



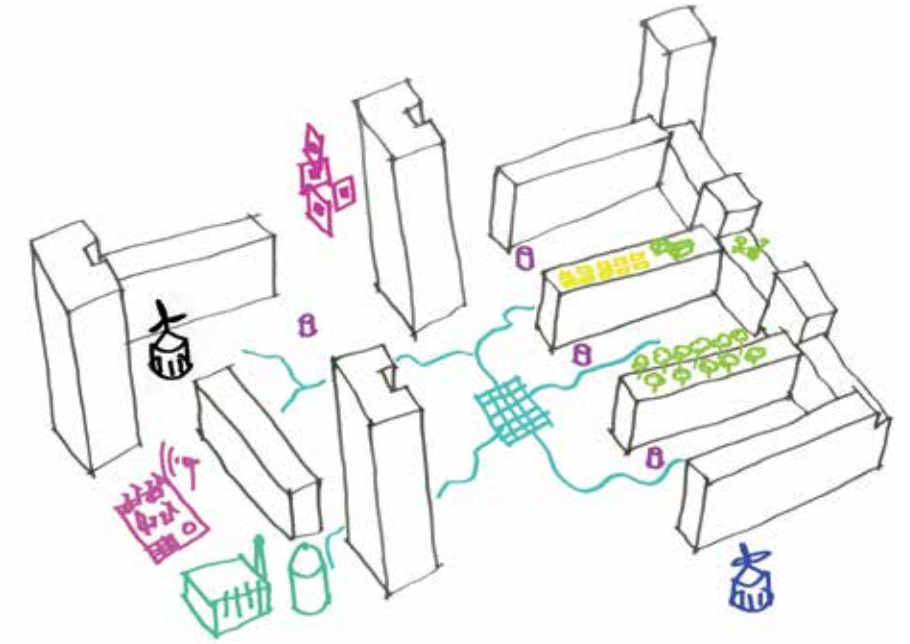
78m², split level, for
family with 2 children

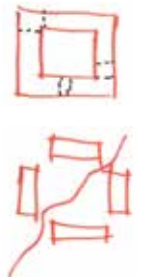
SPORT

COMMUNITY

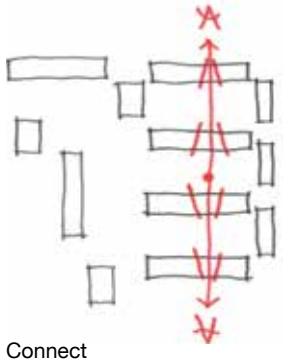
NATURE

HIGH STREET

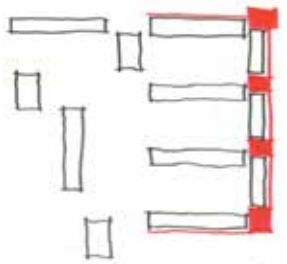




Find the way



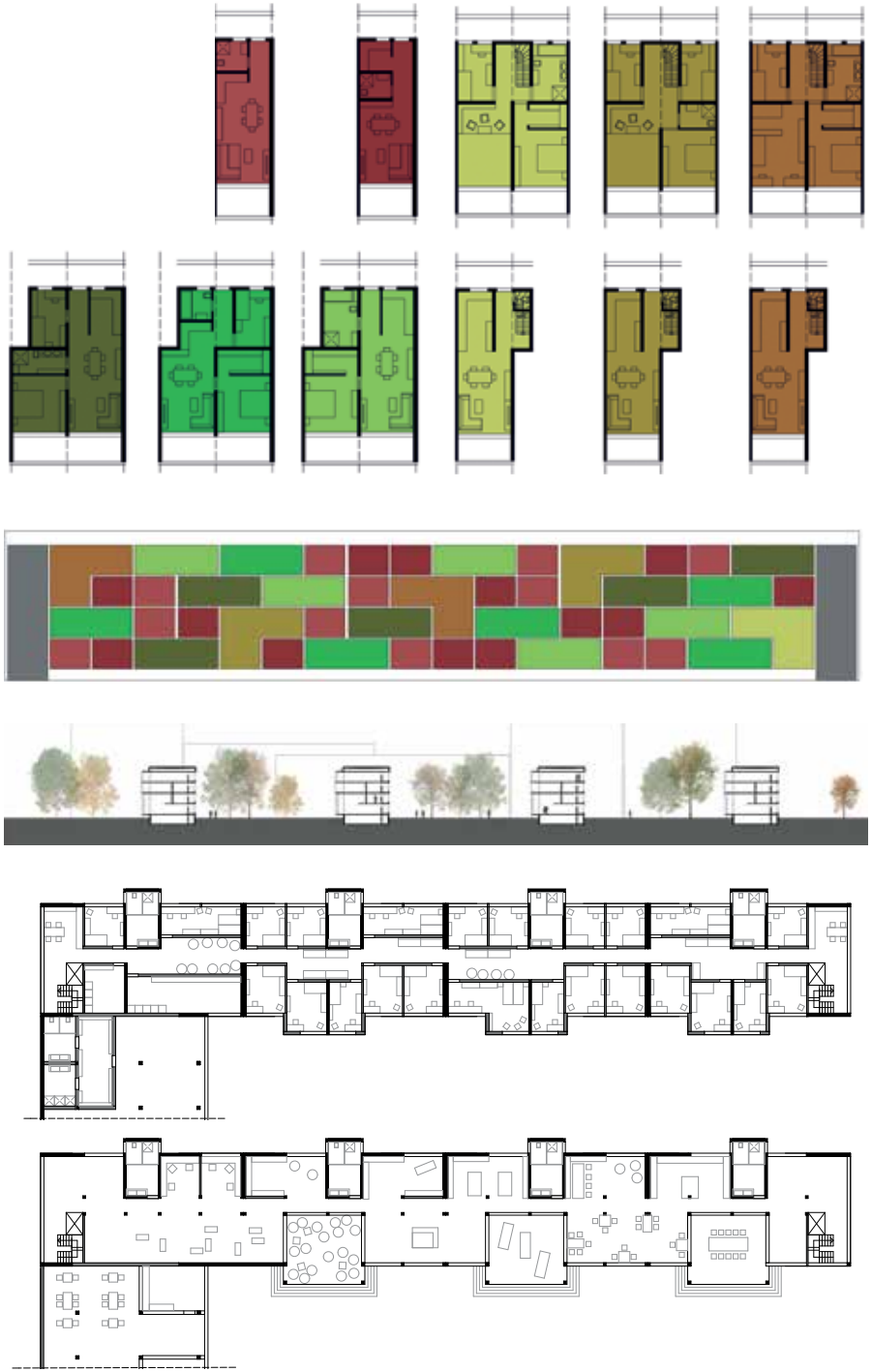
Connect



Find the space

DIVERSITY - COMMUNITY

SABRINA BAUER
STEFANIE FUSSEDER



2 ACTIVATION

[4] LBGO ARCHITEKTEN

THE ADAPTABLE CITY

Christian Goldbach

The student's design assignment for the summer term was to develop a transformation strategy for the town of Bad Endorf, Bavaria, Germany.

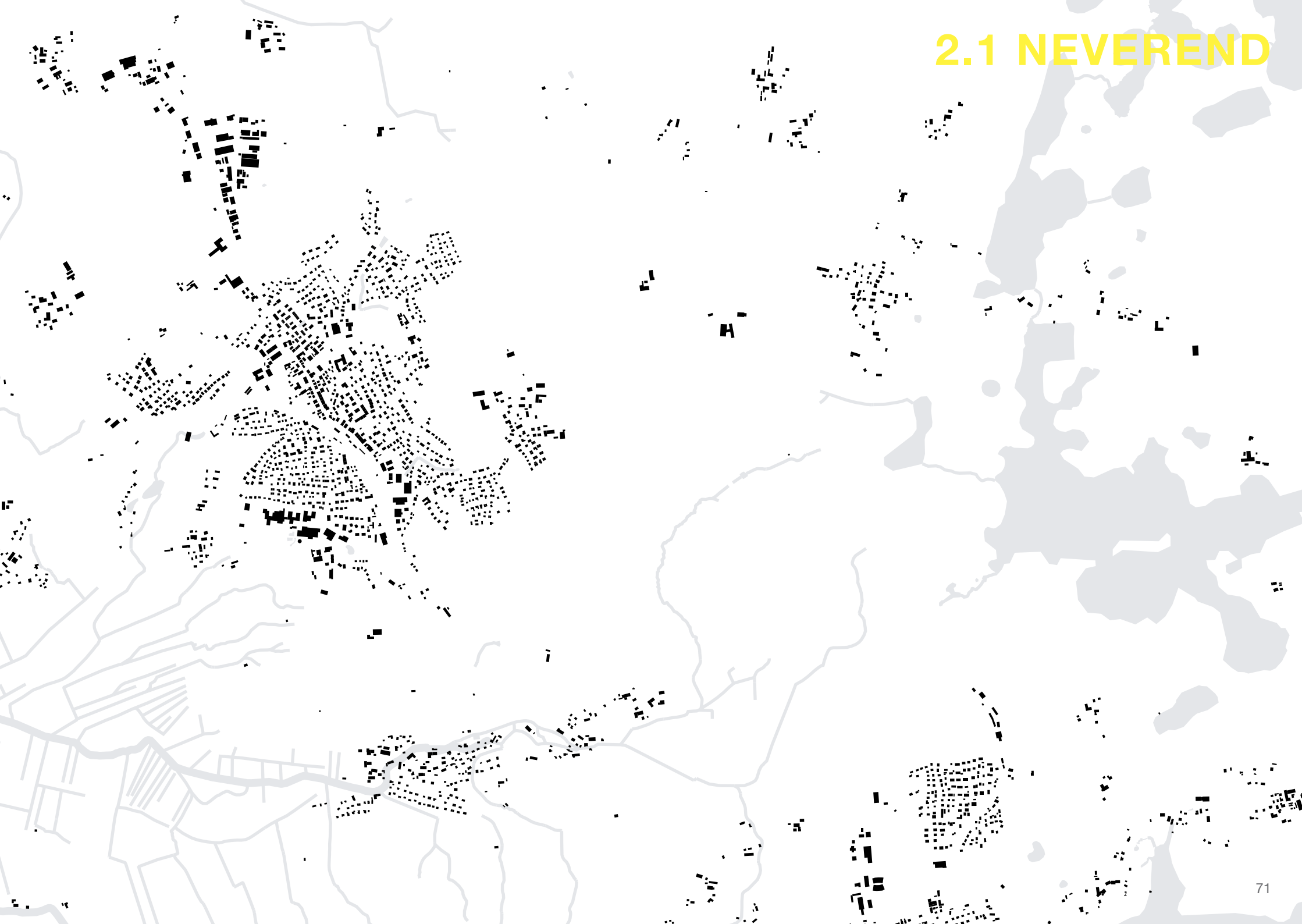
Bad Endorf is located southeast of Munich next to Lake Chiemsee, within a pristine Alpen landscape. It is an ideal place to live and work in harmony with its natural surroundings. Bad Endorf has more lakes than any other region in Bavaria, and is an attractive location with many wellness baths and health spas. The local clinics provide excellent health and rehabilitation services, which are supported by a variety of local hotels, short-term rental units, and restaurants. At first glance, Bad Endorf is a perfect balance of commerce, culture, and nature, yet after closer inspection, one notices a lack of a few essential unifying spaces, such as a town center or market. In addition, Bad Endorf is broken into two parts by the railway tracks which pass through it. While the presence of shops, a church, schools and a kindergarten provide for an active public sphere, a clearly defined ‚meeting point' is nowhere to be found. Furthermore, the constant traffic is more the result of travelers passing through the town heading toward the Alps, rather than visitors coming stay in the town itself. Finally, attempts to promote ownership for local businesses and residents have had limited success. While Bad Endorf has tremendous potential, ideas to promote growth have not yet been effectively implemented and cooperation has often been met with internal political strife.

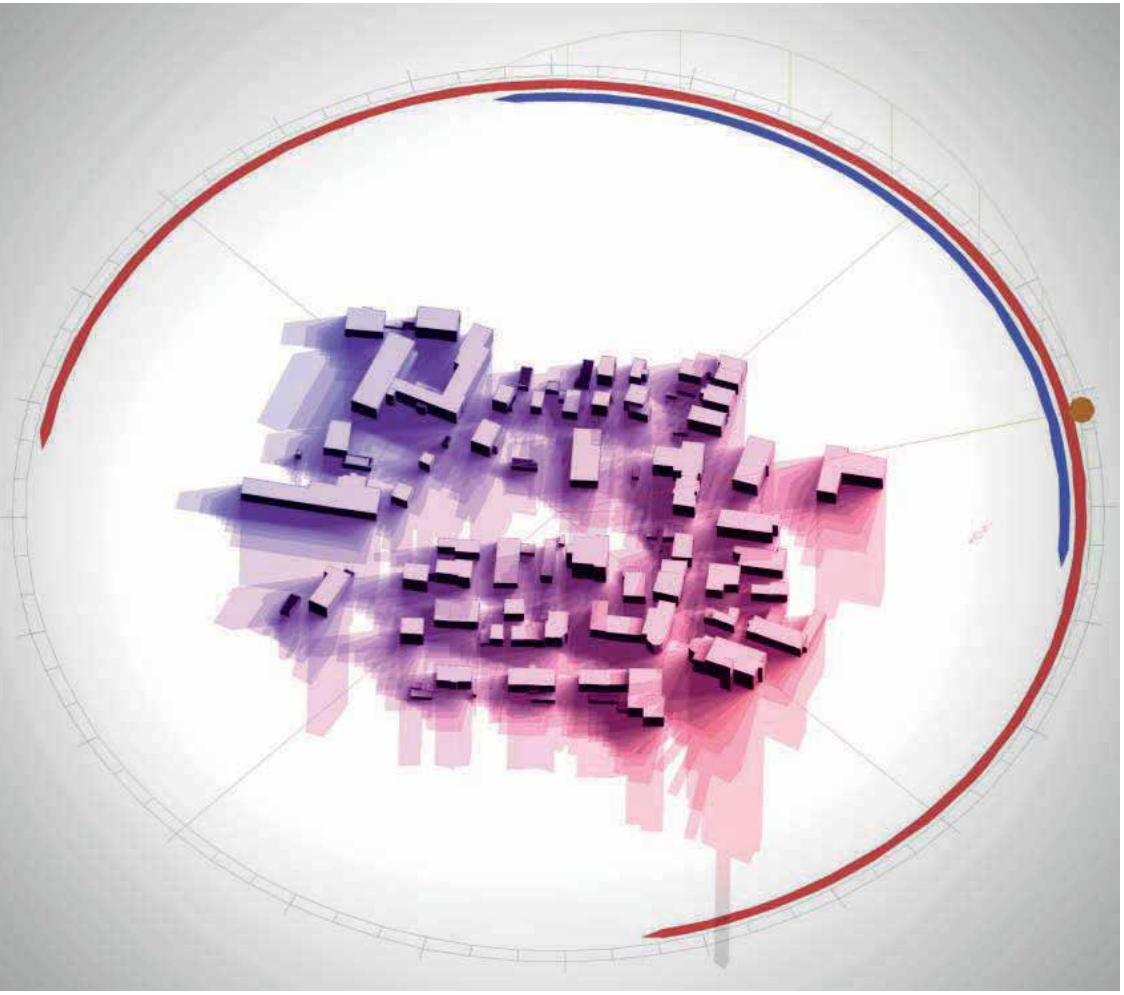
The established health centers and spas are slowly losing their attraction as they are not currently prepared for the structural changes taking place. To move forward, Bad Endorf will need to ‚re-invent' its identity, along with how it presents itself to the outside world. This can be partially resolved with a comprehensive advertising campaign, but lasting, longer-term change is needed by developing architectural solutions within an overall masterplan.

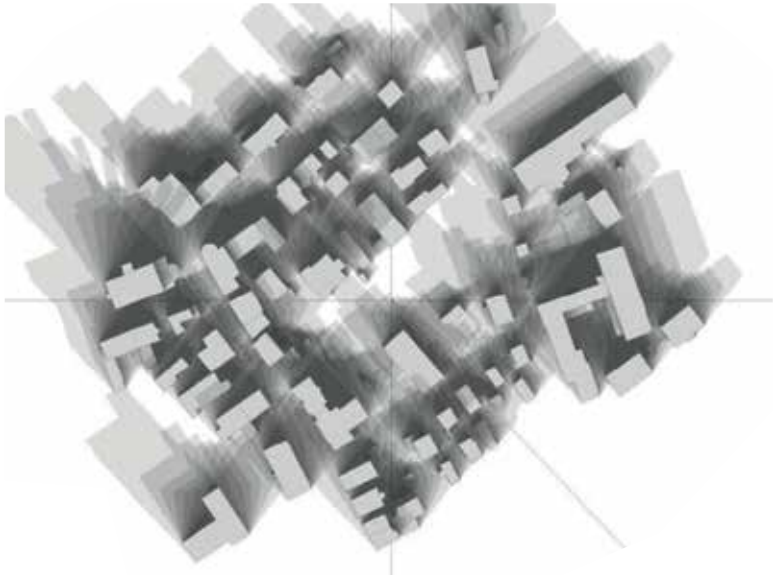
In Bad Endorf, there are two underused open areas that are big

enough to be considered for positive urban development. One of these sites sits near the middle of town, another east of the main street, bordered north and south by residential zones, but broken into small sections.
The student's assignment was to develop a strategic intervention plan for the open spaces that compliments the current town's plan, clarifies which functions are currently needed, and brings together the town as a unified whole.
Activities that currently occur on site include:
Each week a market is set up in an old ‚barn', where local farmers sell their produce. Although it occupies only a small part of the site, it is a popular event visited by many residents and tourists. In addition, the site is currently used as a parking lot. The square is surrounded by one-to-three-storey buildings except for two narrow entrances. The openness of this site creates the opportunity to design new architectural interventions amid a growing city, without the need to vacate or tear down existing structures.
The students began with a detailed site analysis checking traffic patterns, asking residents about the town's current condition and their desires for it, as well as researching precedents that can be used as examples from similar situations elsewhere. They documented the variety of existing uses, verified accessibility, and developed strategies to integrate and connect the open areas with their surroundings.
The initial studies demonstrated that Bad Endorf's location is excellently situated. For example, popular hiking and biking trails already pass through the region, or could easily be re-directed through the town center. A wide range of nearby natural attractions and destinations could be mapped out and easily reached using Bad Endorf as a central ‚basecamp', making the town itself a desirable destination. The growth of the outdoor recreation industry would reinvigorate the established wellness baths and spa, which would, in turn, promote more outdoor recreation; thus creating synergetic parallel growth.
Using the results of the analysis, each student group proposed appropriate uses for the open areas of Bad Endorf. Examples include a location for a common area, catering, bicycle repair, sales of sporting goods, a hotel, tourist information display, a curated exhibition, or a ‚meeting place' for the community of Bad Endorf. Program options were also considered on the upper floors of the buildings such as residences, commercial spaces, and other innovative uses like a center for start-up companies that would benefit from a rural location, nearby farms, lakes and mountains, rather than locating in urban areas.
The students all concluded that the newly designed structures needed to express a common architectural language to create a unified sense of place and identity. Different approaches to this language were explored through studies of roof forms, building heights, facade materials, and the connection between indoor and outdoor spaces.
In addition, the relationship between the new building and the existing buildings was discussed, in particular how elevated points in the new designs create an architectural dialogue with the spire of the existing town church.
These studies revealed that the site is most activated when it is connected to its surroundings from both sides. Doing this allows travelers to move through the site, increasing the site's visibility, while also binding the site together. The ground floor zones are best used exclusively for public functions of the local community. Ideally, parking would be hidden underground, so that the ground floor can be made available for pedestrian plazas, courtyards, parks, and green spaces. The goal for each study is a clear expression of local character.

2.1 NEVEREND

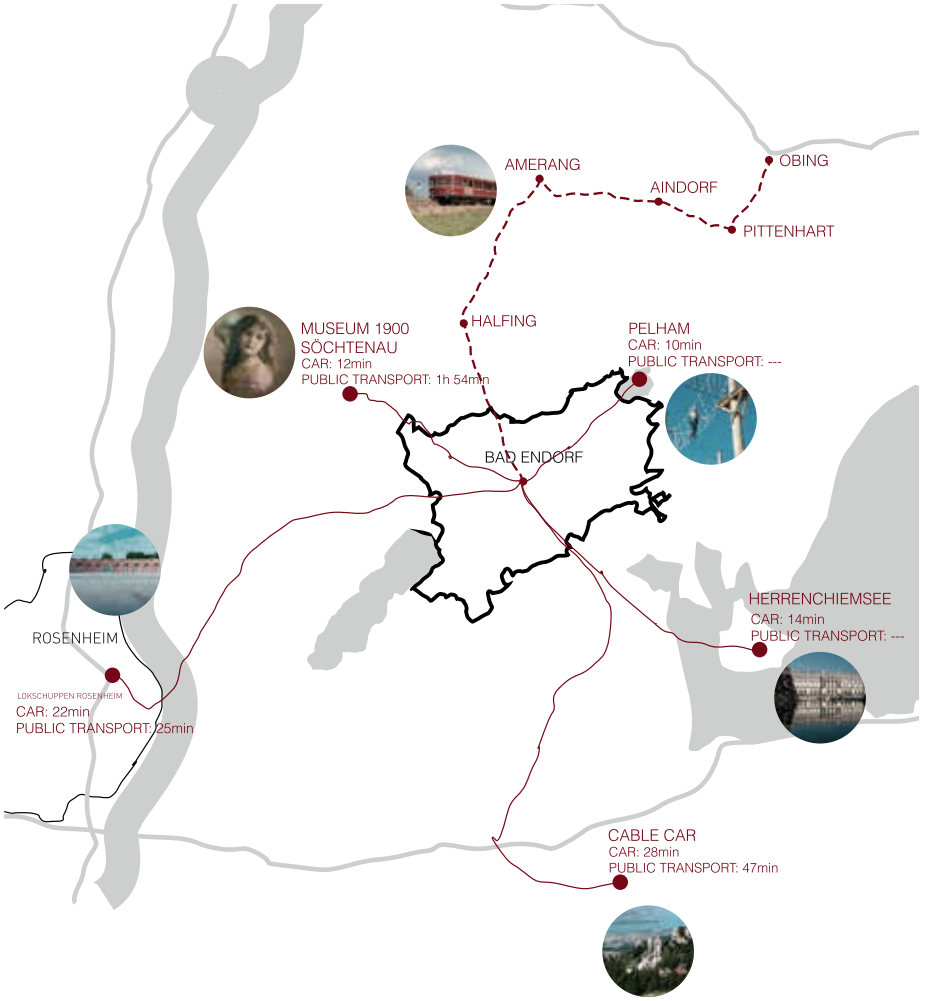


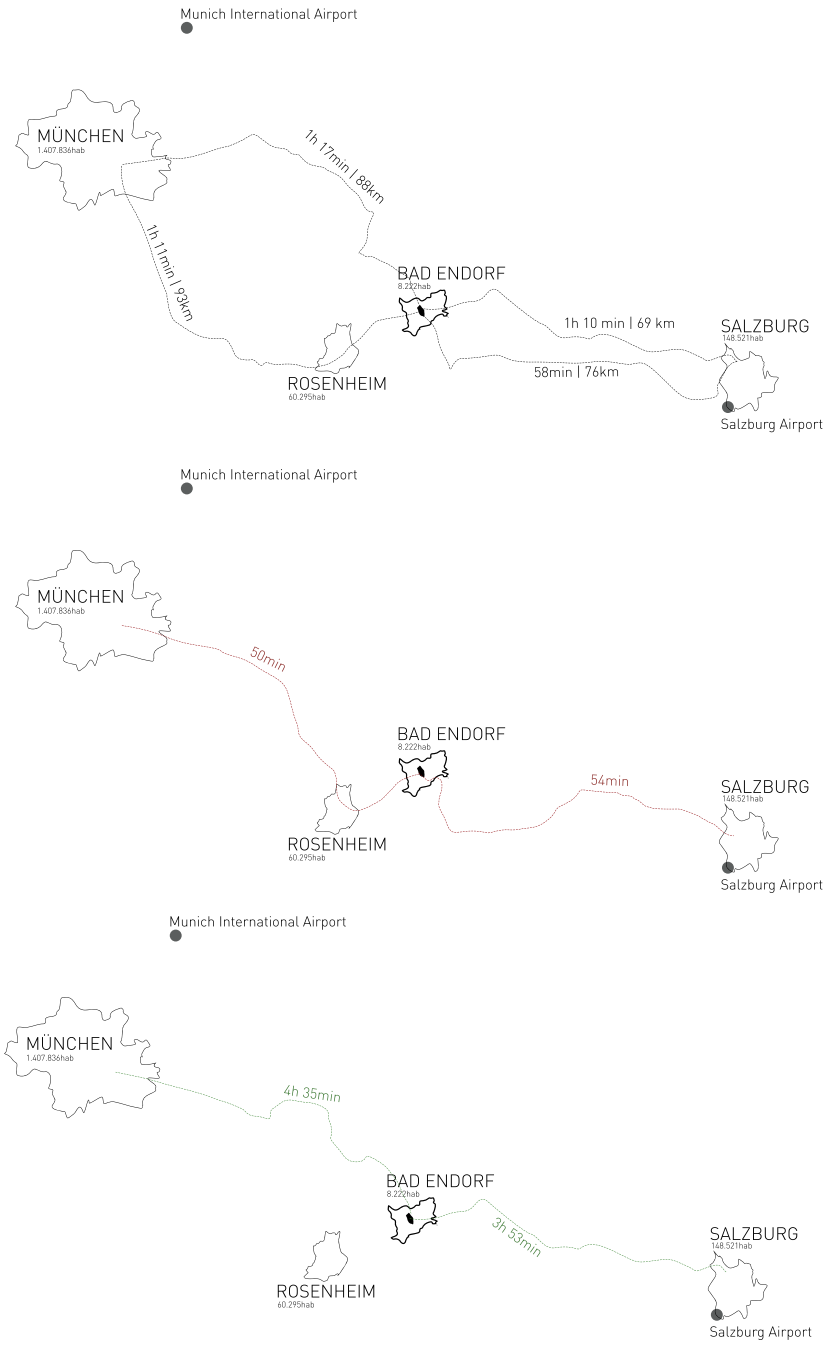




MOBILITY ANALYSIS

CONTEXT

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MÜNCHEN
1.407.836hab
1h 17min | 88km
1h 11min | 93km
BAD ENDORF
8.222hab
1h 10 min | 69 km
58min | 76km
SALZBURG
148.521hab
ROSENHEIM
60.295hab
Salzburg Airport
Munich International Airport
MÜNCHEN
1.407.836hab
50min
BAD ENDORF
8.222hab
54min
SALZBURG
148.521hab
ROSENHEIM
60.295hab
Salzburg Airport
Munich International Airport
MÜNCHEN
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4h 35min
BAD ENDORF
8.222hab
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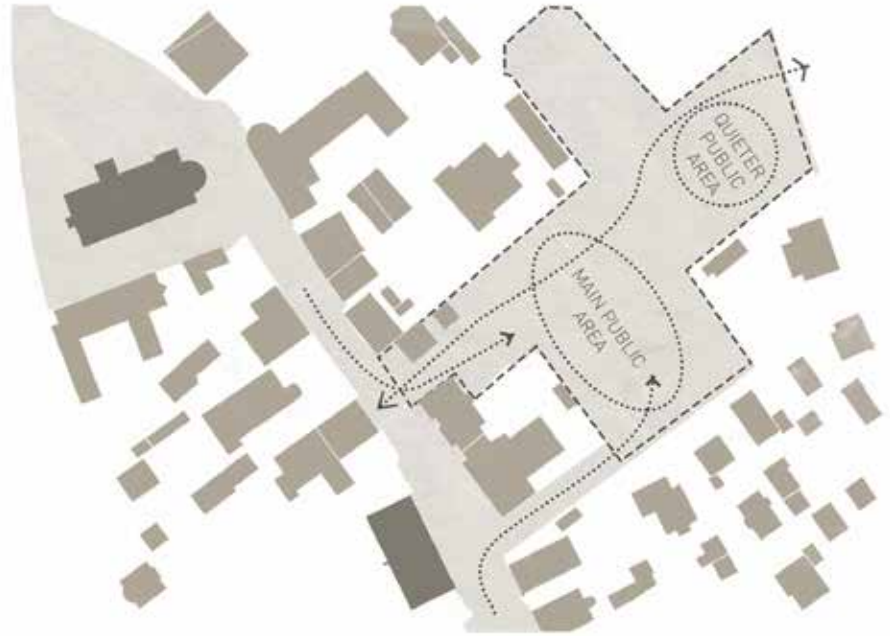
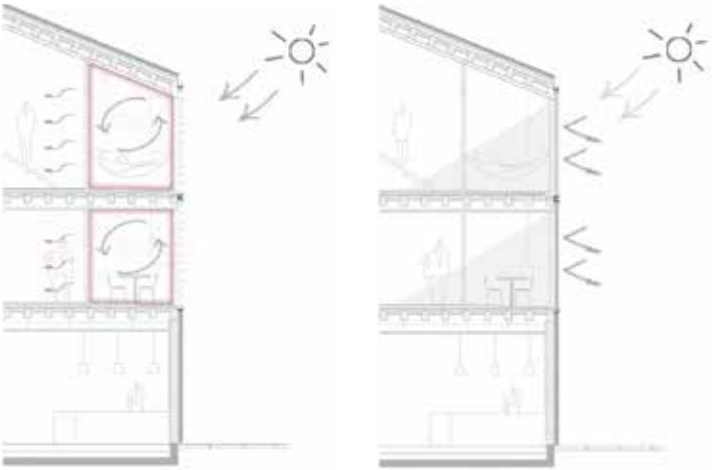
ROSENHEIM
60.295hab
Salzburg Airport

BAD ENDORF

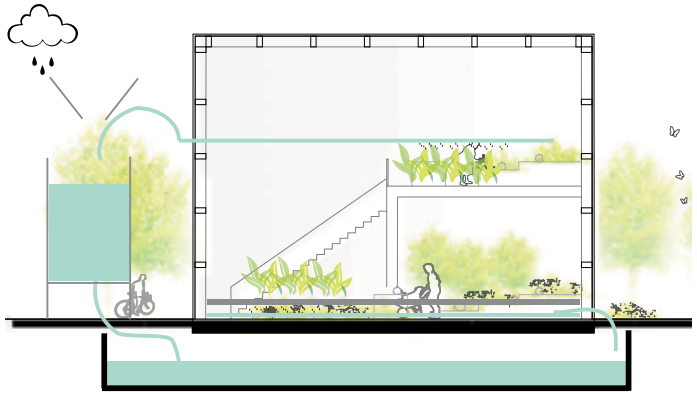
MARIE BENDOVA
AINA TAPIAS TERRE

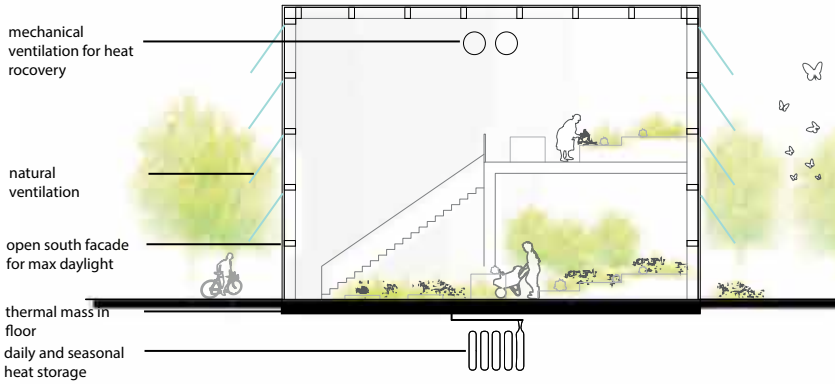




GREENDORF

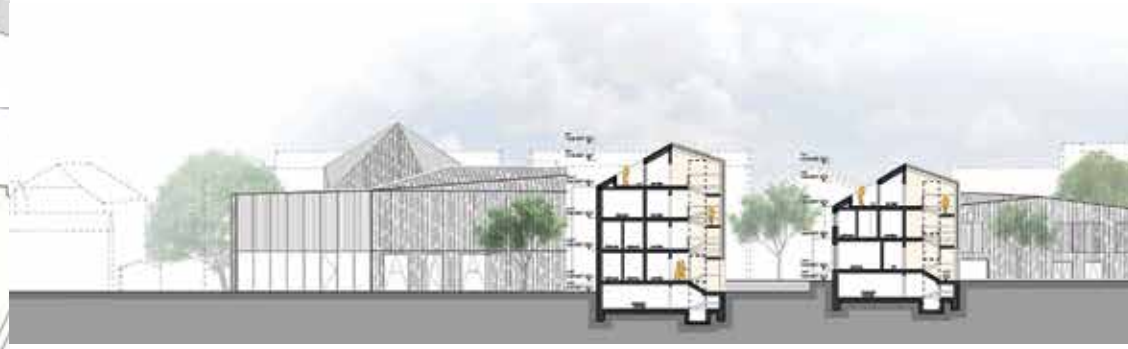
MIROSLAVA DENINA
KRISTINA STEFANOVA





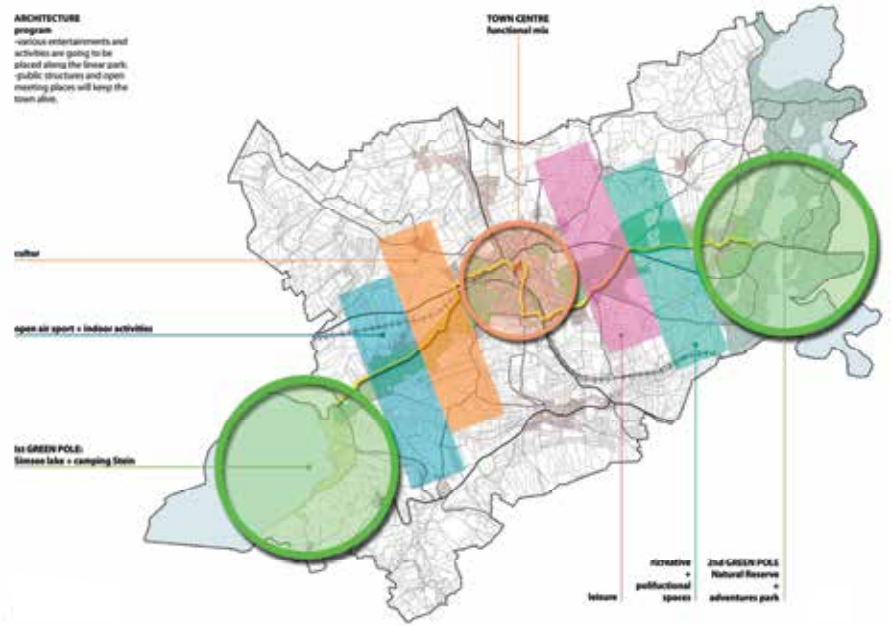
IDENTITY CORE

EDUARD MILDENBERGER



PATHENDORF

ASIA BARNOCCHI
ROCIO PELAEZ



[5] DAVID SELJE

URBAN TRANSFORMATION

Thomas Auer

To achieve a carbon neutral building stock – which is required by the EU Carbon Roadmap by 2050 – our efforts need to be smart and holistic on all scales of design. In addition, climate change and climate control particularly in our cities will contribute to the challenge – as well as other issues such as demographics, urbanization, etc. All of this will change the built environment, which requires a massive transformational process.

At the same time, it is essential that a transformational process leads to good environmental conditions – indoor as well as outdoor (public realm). This requires mitigation and adaptation strategies, which can only be accomplished by adapting the design process: ‚Form Follows Process' (Chris Bangle, chief of design at BMW between 1992 and 2009). Integrated design strategies and a performance-driven design process is the basis to find answers on the question of our time. A transformation, which needs to be radical in order to achieve de-carbonization and a highly comfortable environment at the same time – should be aspirational as well as inspirational.

Research by design becomes fundamental to develop a comprehensive approach. Engineers cannot develop answers by themselves; also designers, architects and planners can't alone accomplish the task. It requires an integrated approach, together with humanities and other stakeholders, such as the public.

The design studio provides an environment where we can test such an integrated approach. Together with architectural students, conceptual approaches are developed and their implication on the built environment are tested. Over the past three years, several strategies were developed and tested in various tasks. Each task and each project is like a piece of a puzzle, which contributes to a bigger picture. A picture, which hopefully gives us a hint on the ‚how' question and helps us to curate a transformational process, so that we don't get lost in transformation.

In addition to political, economic, and demographic developments, global warming is significantly influencing inhabited building culture in Germany. The European Union's ‚Carbon Roadmap 2050' stipulates the emissions reductions that need to take place across different sectors. According to the road map, CO2 emissions from buildings need to be reduced by 90 percent of their 1990 value by the year 2050. This applies to all inhabited buildings. Such buildings are responsible for around 40 percent of CO2 emissions, which is why the construction sector is so important. This is an enormous challenge that will not only impact technology but will also modify our built environment. Definition of targets has so far been primarily informational. In reality, in the case of Stuttgart, for instance, CO2 emissions have been constant since the mid-1990s, so the gap between the target and the reality is continually growing. Moreover, climatic conditions are changing (rising summer temperatures), which will put a further strain on, and affect above all, our urban centers.

The 90 percent CO2 emissions reduction target in the construction sector can certainly not be met by heat insulation alone, on top of which public criticism of external thermal insulation systems is increasing. The whole area must be considered far more holistically. Among other things, carbon budget limits need to be revised. Apart from building-related energy factors, an infrastructure is needed, especially in the urban context, to facilitate intelligent energy exchange between, for instance, housing and industry. Personal energy and carbon budgets, as in the Swiss ‚2000-Watt Society' model, need to be examined. This would involve computing, aside from a building's running costs, the total energy consumption (or CO2 emissions) of its users divided by the number of persons in each household. Statistics from the American Department of Energy show that commercial high-rises in the USA consume over 50 percent more energy than lower buildings. If, however, one looks at energy consumption per user, it is the other way round. Not that this means that high-rises are usually more efficient in terms of personal energy budgets, more that they are primarily located in urban centers. Because of high rents, the average number of people working here per square meter exceeds that in suburban low-rises.

Increased density inevitably leads to higher energy demands, but above all it shows how misleading area-based energy ratings can be. Per capita living space is rising constantly in the western world. A personal energy budget would deal with this phenomenon no less than with energy demands for home-to-work commuting. If the distance is 30 or more kilometers – using a private car – then the energy standard of the building ceases to be relevant.

Increasing outdoor summer temperatures are another challenge. Urban spaces in particular often suffer from the so-called heat island effect. Urban overheating is largely caused by solar radiation being absorbed by sealed areas and buildings that retain heat during the night, resulting in limited and insufficient nocturnal cooling. Temperature records of Paris in the record-breaking summer of 2003 indicate that the temperature of downtown Paris was 1° to 2°K higher than in surrounding areas during the afternoons, but 10°K higher at night. If we fail to reduce urban overheating, we will be forced to equip buildings with air conditioning, which will take us yet further away from the Carbon Roadmap targets.

In the context of the 2000-Watt Society model, Switzerland has defined the interplay of efficiency, consistency, and sufficiency as the key to significant CO2 emissions reduction. Apart from energy efficiency and the transition from fossil fuels to renewable energy sources, lifestyle is also coming under scrutiny in respect of sufficiency. A holistic view comprising extended carbon budget limits and a personalized approach to all energy-related aspects of life will certainly do the subject far greater justice.

With regard to buildings in general, the heat-insulating properties of building envelopes must be improved and/or heating supplies efficiency and CO2 emissions optimized. Provision must also be made for aesthetic and planning-and-building-cultural aspects. Aesthetic considerations – apart from listed buildings – are urgently necessary, particularly in extended inner-city contexts. Just as entire architectural ensembles are listed, buildings whose facades and materials contribute to the appearance of a city or city district (e.g. clinker brick facades) must be defined. The debate here sometimes takes on an uncalled-for,

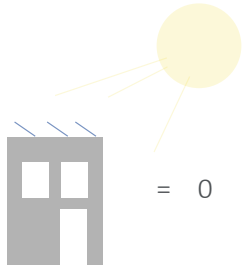
dogmatic tone. In addition to interior thermal insulation, the heat-transfer properties of windows, roofs, and basement components need to be optimized without their significantly affecting building design.
In densely built, mixed-use districts, energy exchange, above all heating, between users is an option. The waste heat from a computer center or bakery, for instance, can be used for heating apartments. As waste heat temperatures tend to be low, energy must be deployed near the producer, otherwise the energy demands of the pumps quickly exceed any benefit gained. Seasonal heat reservoirs or geothermal probe fields (near-surface geothermal energy) allow combinations with solar thermal or PVT (photovoltaic with an integrated solar thermal collector) and can offset seasonal demand fluctuations. Supplementing seasonal heat reservoirs with block heating plants and fuel cells, if necessary, is economically and ecologically interesting. High efficiency can thus be achieved by means of a customized mix of technologies and integrated local resources.
The large-scale deployment of photovoltaic and wind energy is leading to increasing load fluctuations on the electricity grids. This will grow substantially in the next few decades. Big load fluctuations are more frequently producing short-term power grid surpluses. The building sector, with its inertia, can serve as a reservoir here, either through short-term absorption of large quantities of surplus power (power-to-heat) or by switching off big energy consumers such as heating or cooling (load management). Action such as this can lead to potential synergies between the power grid and the existing architectural substance and is an interesting alternative to the current purely passive concept of improving the energy efficiency of buildings. To exploit this potential, an overhaul of panel heating and cooling systems, combined with geothermal heat pumps, must be accelerated, as well as amending energy conservation regulations to cover this option.
Inadequate new housing construction in urban centers over the past two decades, together with increased per capita space demand, has led to the populations of our major cities falling perceptibly compared with the 1980s. At the same time, daily commuters are growing in number. The only answer here is to increase affordable living space, whether in the urban or suburban context. Urban mobility cannot fail to change for all types of transport. Extending local public transport will be as necessary as continuing to develop cycle path networks and the infrastructure for other, possibly hitherto unknown, means of transport. Statistics indicate that, in the West, the per capita kilometers traveled are already falling, if only slightly to date. This decline would increase as a result of, for example, work becoming yet more flexible. Consequently, cities could reduce or dismantle car-related infrastructures and control traffic flows.
As a result of rising summer temperatures, public space will need to be used far more intensively to regulate the urban climate (microclimate). Surface radiation reflectivity (from streets, roof areas, etc.), shade, as well as green areas and bodies of water will become increasingly important. Studies here indicate, though, that green spaces exert a quantifiable effect only on their direct environment. It will be necessary to vegetate entire urban areas much more intensively. The ratio of tree-shaded urban space will become an important index in calculating the heat island effect. A tree canopy cover index has already been introduced in the USA.
This needs to be combined with the planning of appropriate-size buildings. Wind gaps must ensure that cities receive sufficient fresh air in summer. Similarly, on hot days, buildings will be able to channel wind into public urban space from higher strata of air.
Part of the space needed will come from the deliberate dismantling or reorganization of transport infrastructures. Private spaces outside architectural structures will also be able to make central contributions. As a consequence, many boundaries between public and private exteriors will merge perceptibly. Inner-city fruit and vegetable cultivation – urban farming –can also contribute positively toward regulating the urban summer climate.
The promise of economic prosperity will inevitably attract increasing numbers to the cities. The resultant population densities would create benefits in energy efficiency (infrastructure) and mobility (fewer commuters, a city of short paths). Locally dense populations, if successful, can potentially enhance urban quality in city districts, right through to the polycentric city.
Yet this clashes with the need for extra green areas for climate regu-

lation and with the fact that many major cities have a dearth of open spaces. These conflicting goals mean that post-densification of the population must either occur in suburban space, or as a result of increasing the height of buildings, which again would alter the aspect of our cities. From the urban planning point of view, both are conceivable and feasible. Compared with a post-densified city center, suburban space, particularly after 2030, will be able to react more flexibly to demographic change and possible population decline.

The success of the Carbon Roadmap 2050 will depend on whether we can give a sustainable shape to everyday life. Any kind of ‘eco-dictatorship‘ – i.e., sustainability by fiat – is guaranteed to fail. If a desirable and economic lifestyle can emerge from the various sustainability goals, then social change can take root. Architecture and our handling of Baukultur (construction culture) in the developing human context will be crucial factors here. Architecture defines living space, and is thus in a position to pinpoint sustainable forms of living, and suggest solutions for the demands of the age in which we live.

DENSITY - TARGETS FOR CO_2 EMISSIONS

CONTEXT



MIXED USE RATIO	OFFICE SPACE PER WORKER	AVERAGE APARTMENT	CO_2 EMISSIONS REDUCTION
Work + Recreation **80 %** / Housing **20 %**	80 m²	5 m²	= 149 tons yearly by increasing the percentage of housing even more
Work + Recreation 80 % / Housing 20 %	**70 m²**	5 m²	= 171 tons yearly by designing more compact apartments
Work + Recreation **75 %** / Housing **25 %**	70 m²	**4.5 m²**	= 222 tons yearly by designing more efficient work spaces

+ Lower **transportation** cost

+ Lower **heating** demand

+ Lower **construction cost** per person

+ Better usage of **building facilities, systems** etc.

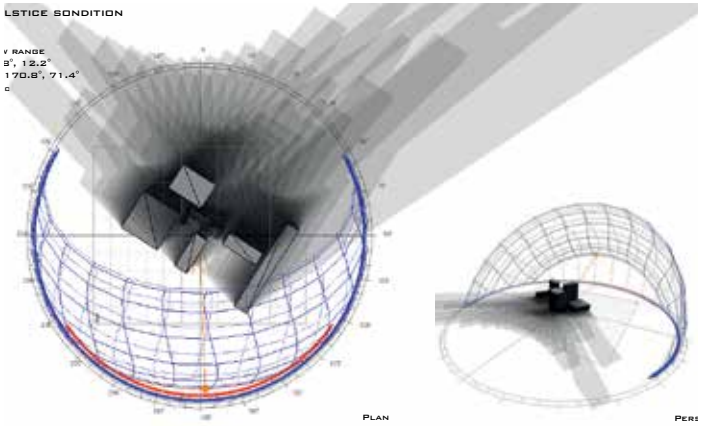
+ Less time spent in traffic

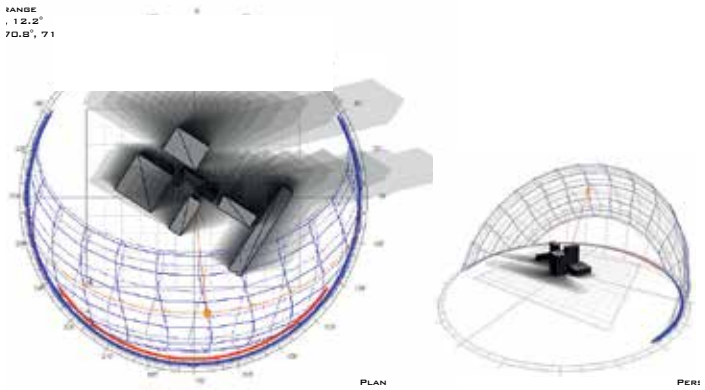
- Stressed infrastructure leading to **over dimensioning**

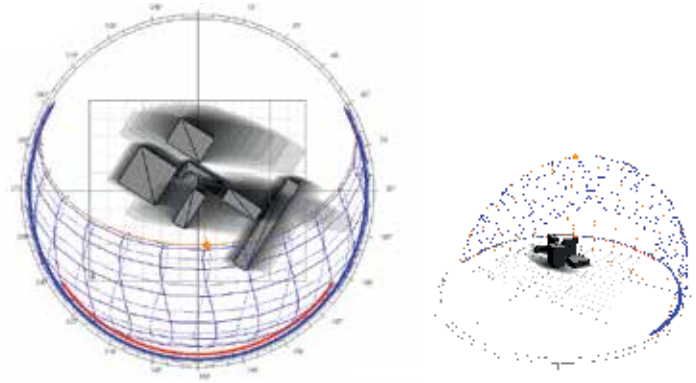
- Use of urban spaces or use of buildings (contact to nature/liveability)

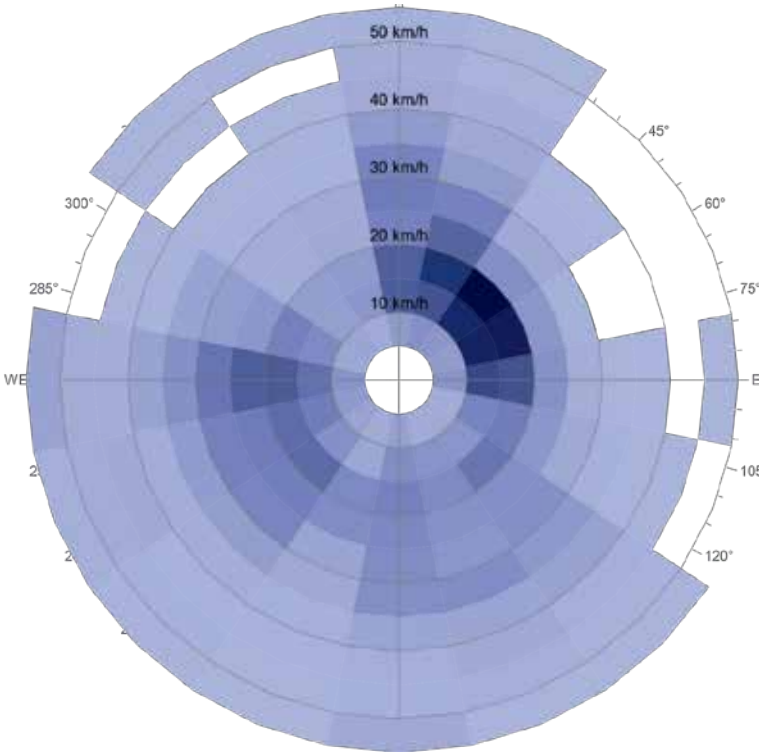
- Is it **problematic** to make people spend a lot of time in the **same** suburb?

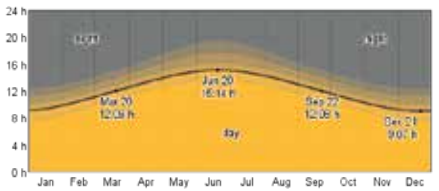
- Increased **cooling demand**

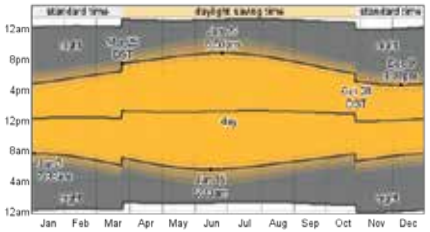

LSTICE SONDITION
PLAN


PLAN



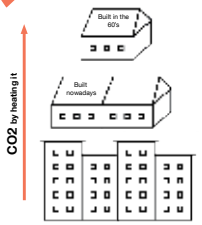

50 km/h
40 km/h
30 km/h
20 km/h
10 km/h
45°
60°
300°
285°
75°
120°
hrs


24 h
20 h
16 h
12 h
8 h
4 h
0 h
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

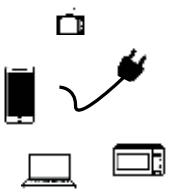

12am
8pm
4pm
12pm
8am
4am
12am
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

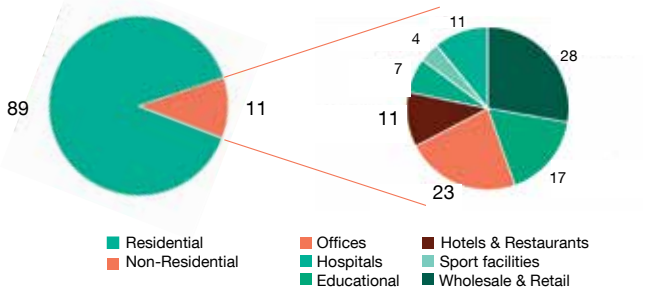
Other Consumption

House

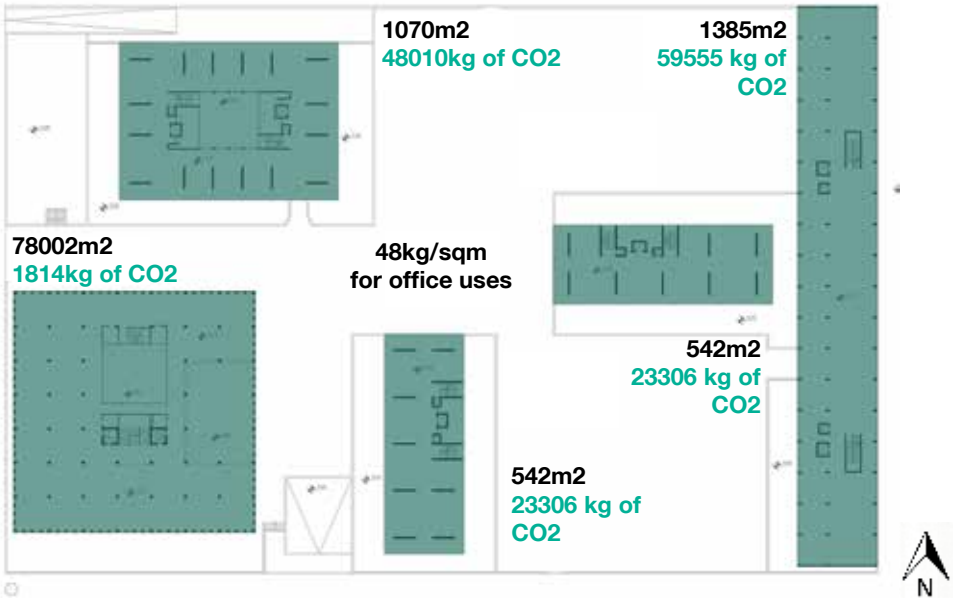


Electrical Appliances

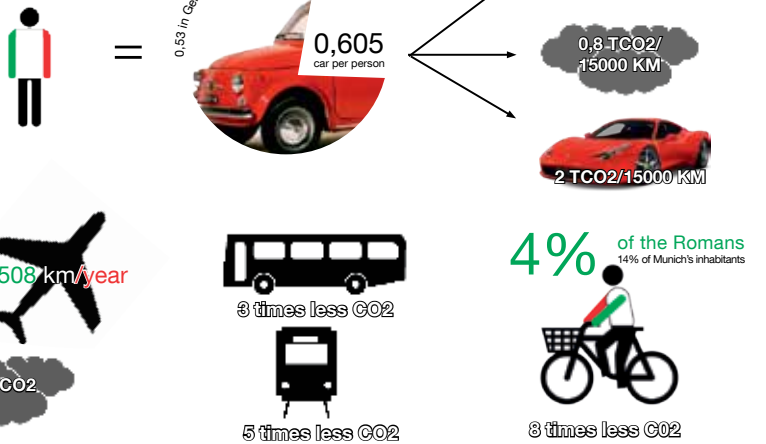




43 KG/SQM
CO2 Emission
for Offices



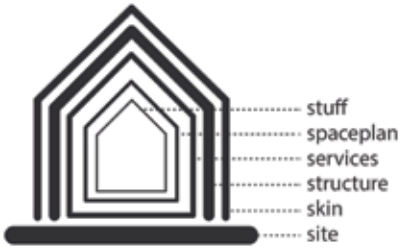
Transport

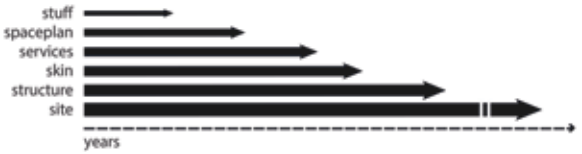


Food

Beef = 9000g CO2/kg
Rice = 4000g CO2/kg
Pasta = 920g CO2/kg
Bread = 720g CO2/kg
Vegetables = 150g CO2/kg
Fruit = 150g CO2/kg

Low efficiency
Noise emission
Land consumption
Difficulties for non-motorized transport
Traffic congestion
Freight distribution
Accidents and safety
parking difficulties
Loss of public space
High maintenance costs
Longer commuting
Public transport inadequacy
Energy consumption
Environmental pollution



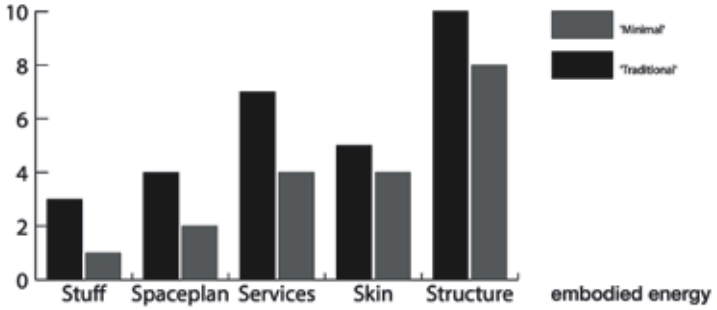


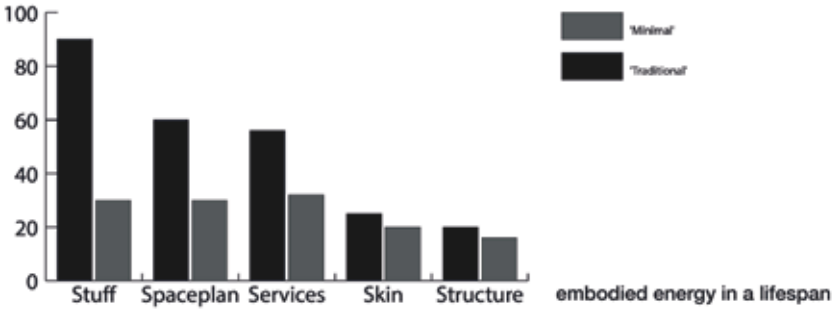
Clean Vehicles

- clean fuel
  - Compressed Natural Gas (CNG)
  - Liquefied Natural Gas (LNG)
  - Liquefied Petroleum Gas (LPG)
- electric & hybrid vehicle
  - electric two- wheelers
- traffic restriction

Integrating & Digitalization

- Integrated fare System *for passenger service*
  - making journey within different transport modes
  - using one ticket
- Intelligent Transport System *for driver - vehicle*
  - providing arrival and departure time information
  - internet 2.0

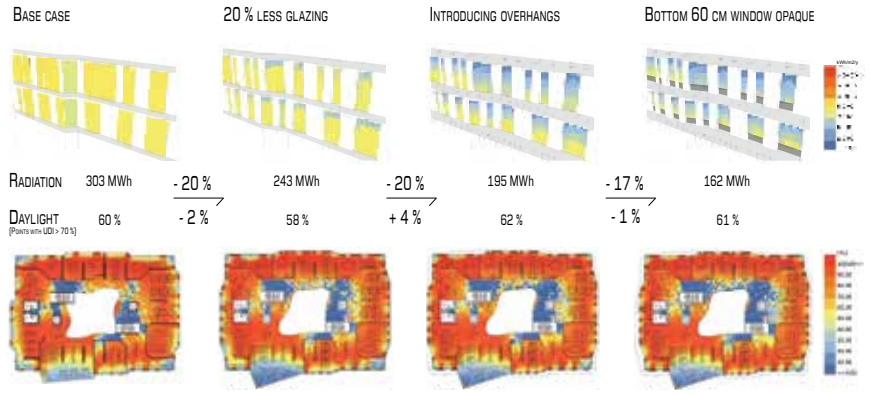


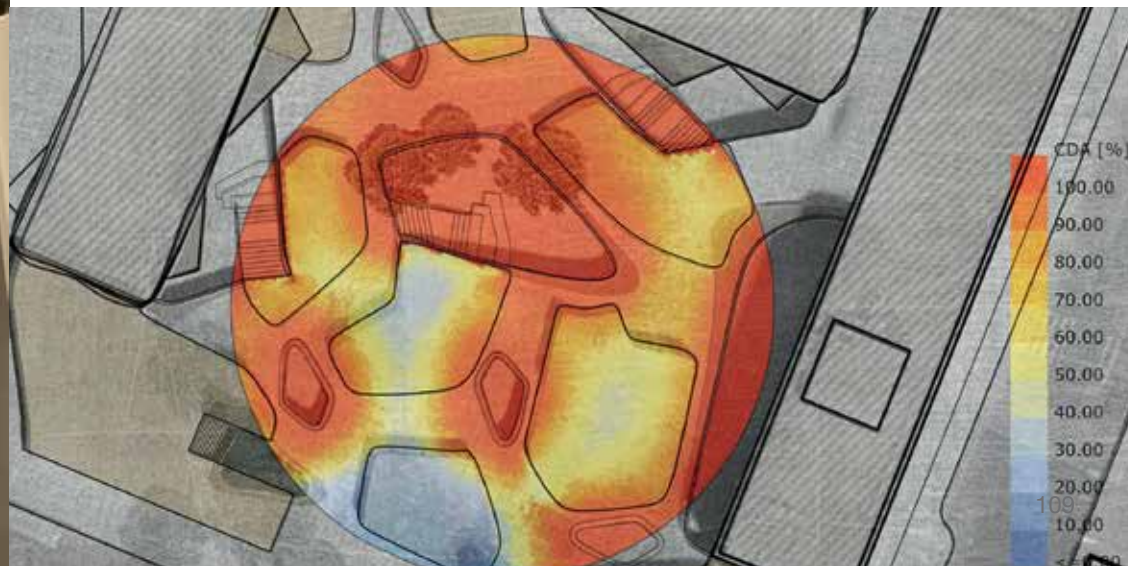



MORE
THAN
MEETS
THE
EYE

SHARING DENSITY

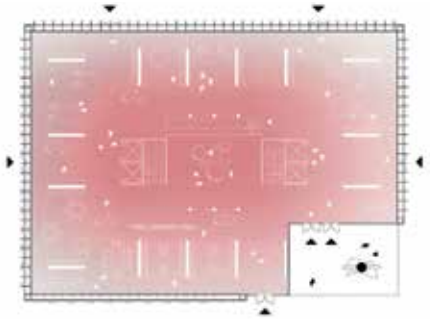
ELENA DREHFAHL
JANJA STARC
PETER JANTZEN
BORIS PLOTNIKOV

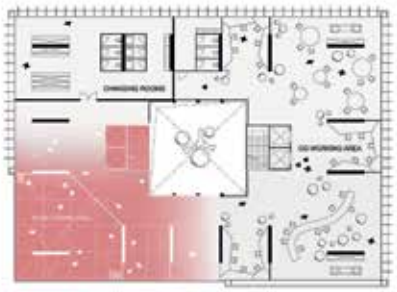


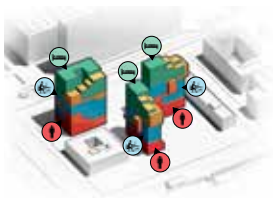


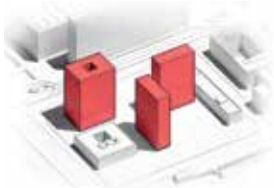
CITY IN VERTICAL

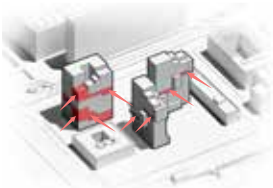
TUGKAN AKKOC
MARIA CHEBOTARENKO,
KATIA MOULEK
FRANCESCO SCARPATI

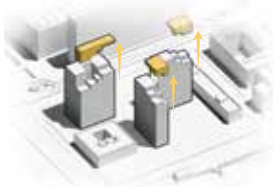


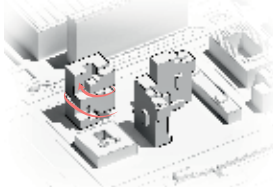


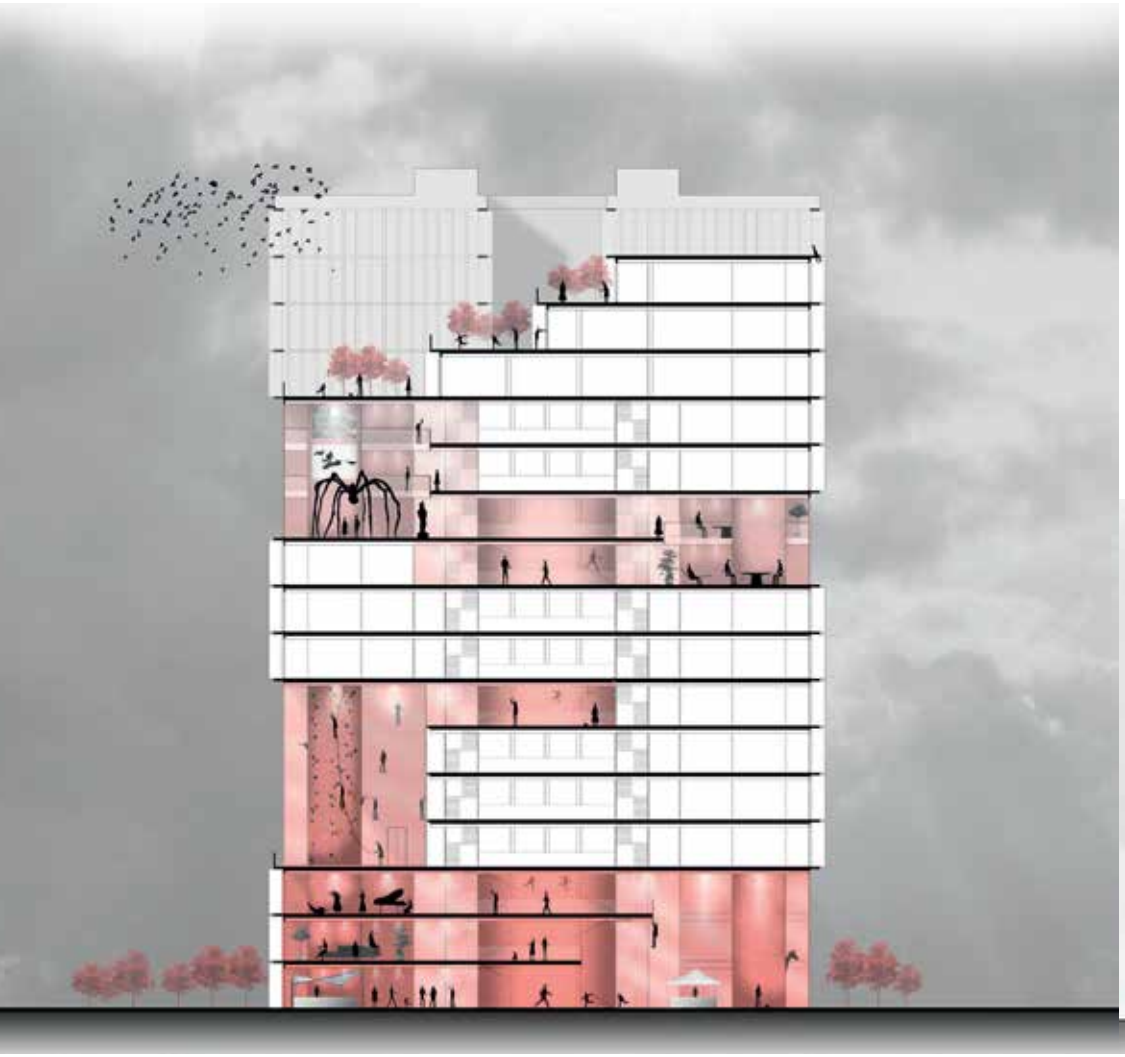


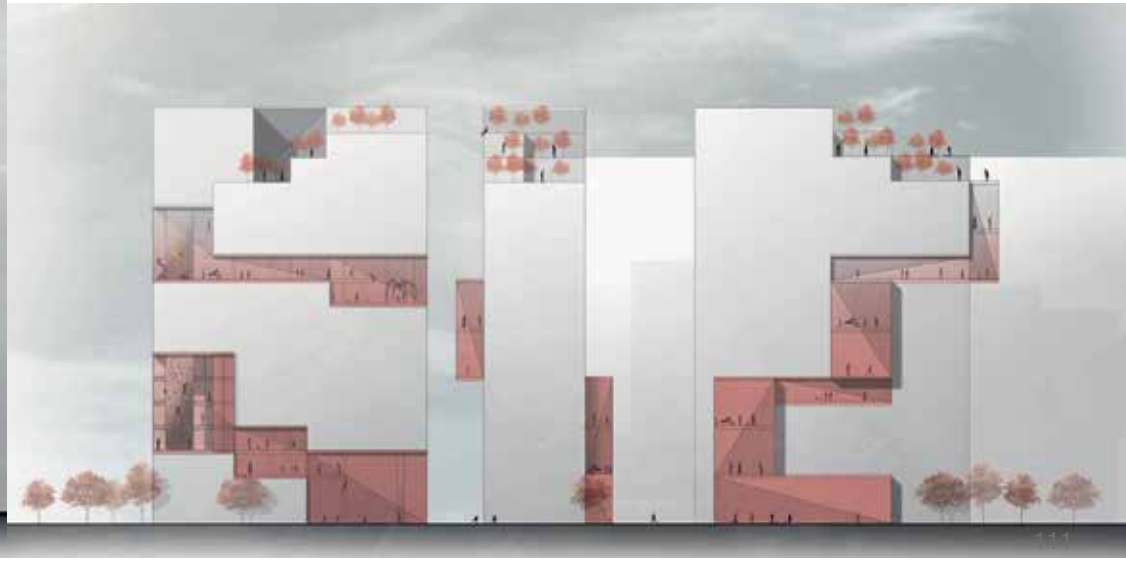






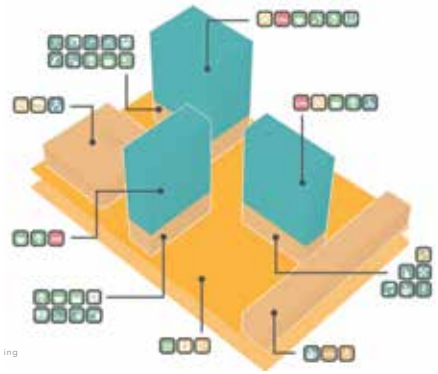


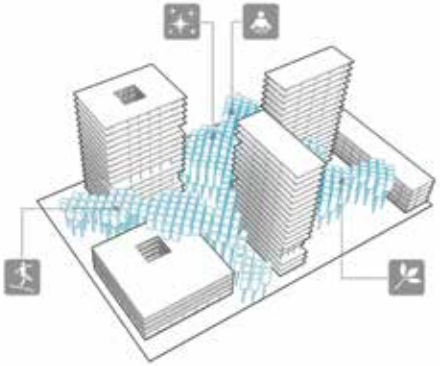


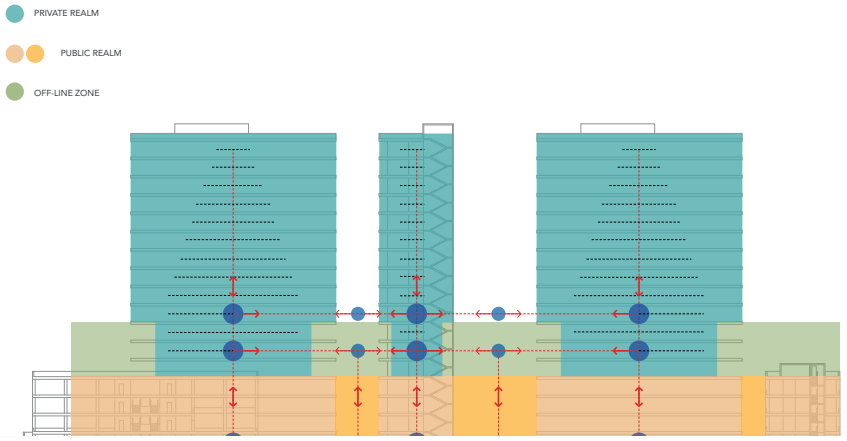


DATA FARM

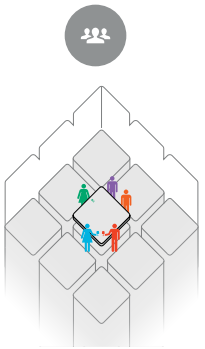
CAMILA BECCAR VARELA
FLORIAN KORNBERGER
OKSANA MADRYKA
ELLIOTT MORGAN



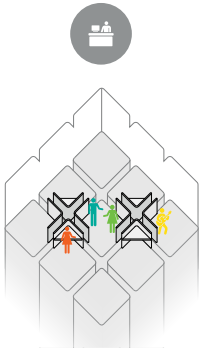




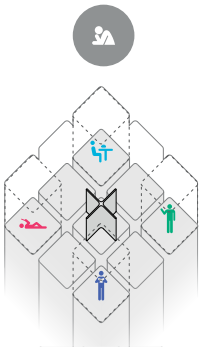
Interact

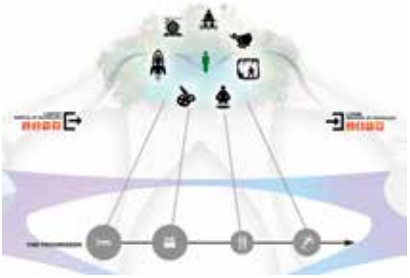


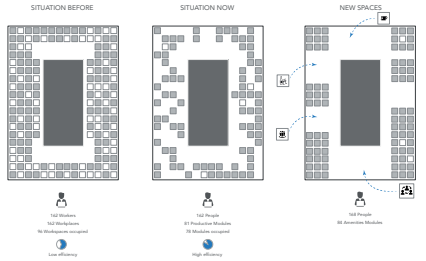
Focus

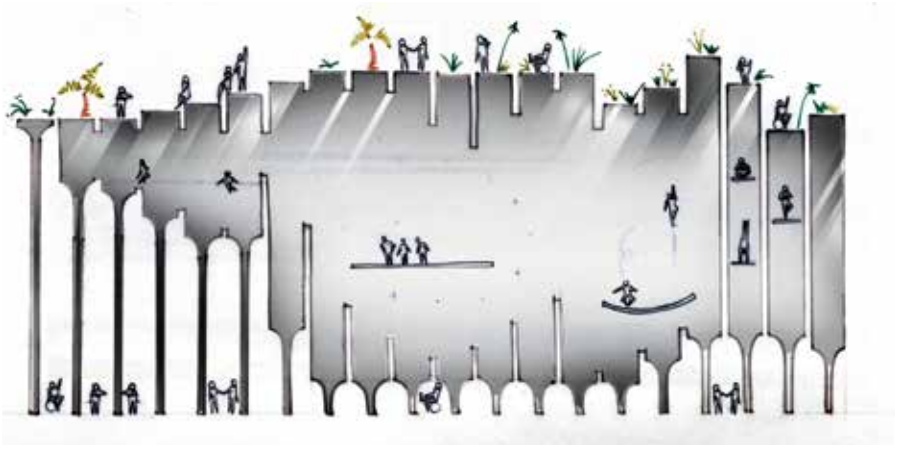


Isolate









CLOUD

CYRILLE BOURGOIN
ANTONIO JAKUBEK
KRISTIAN KARLO
FALINIRINA RAKOTOSON

Functional mixity

Phyiscal proximity

Recycling

Innovative office model

Rent, not buy

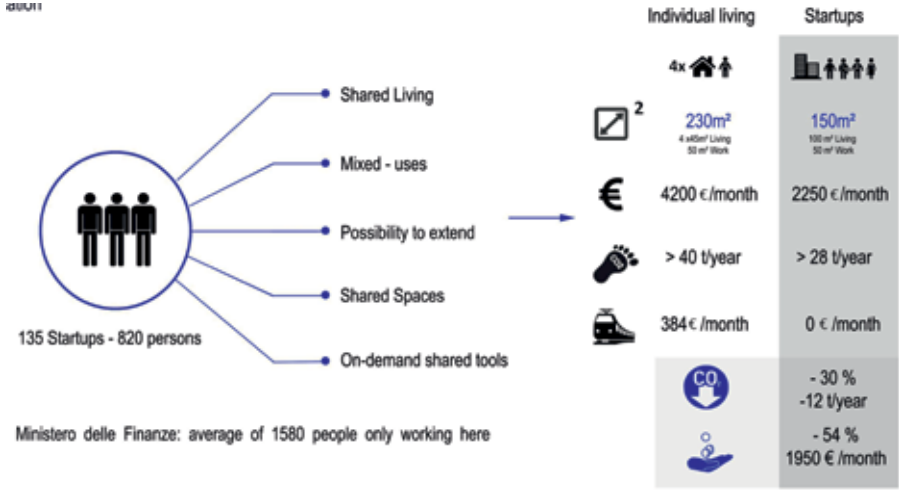
Energy productior

Densification

Energy consumption reduction

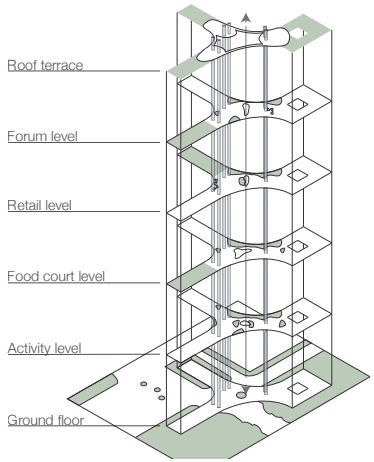
Strategies

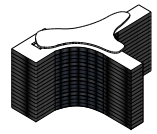
Goals: Sustainable, Start-Up, Social re-lations, Innovative, Attractive, Affordable

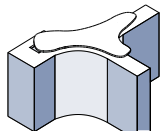


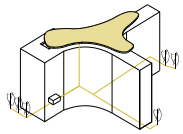
VERTICAL CITY

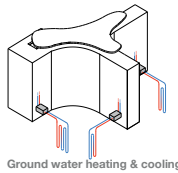
RITA ALESSIO
VIKTORIA BLUM
REBECCA BREHM
KASPER ESPENHEIN




Atrium ventilation

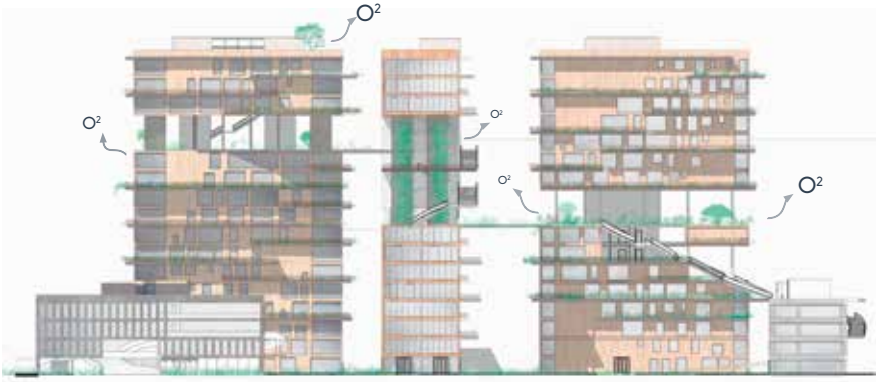

Variating glazing properties


Roof top PV and VA-windmill


Ground water heating & cooling

THE GREEN LINE

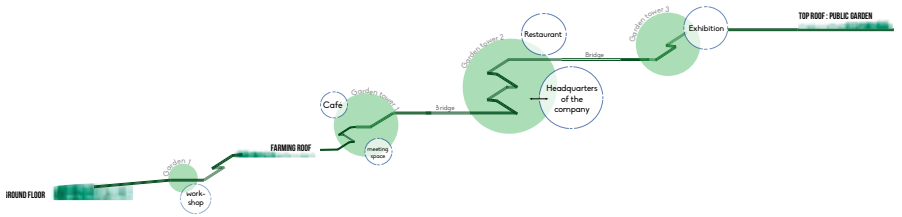
AMELINE DUMOUCHEL
NARGES ETEHADI
LUCIE MARIETTE
ALIREZA ROHANI

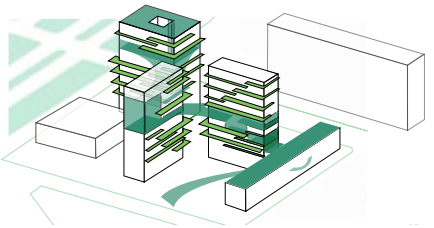


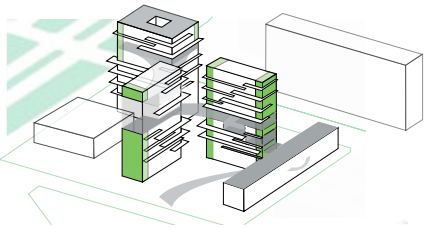
South façade 21st of September, 11.00 10m

East façade / 21st of June, 12.00

East façade / 21st of December, 12.00





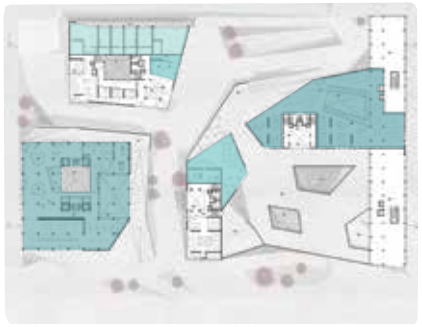


GAL BIRAN
SARA CIARIMBOLI
REOOT SHAYZAF
DAMIANO TOSTI

CLUSTER A

CLUSTER B

GROUND FLOOR 0,00m



FIRST FLOOR +3,65m

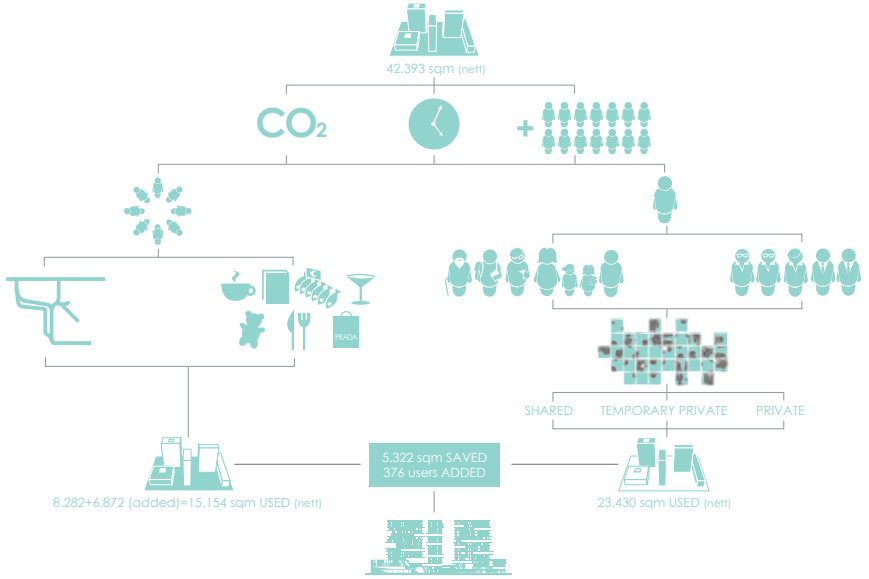
12h active — 24h active

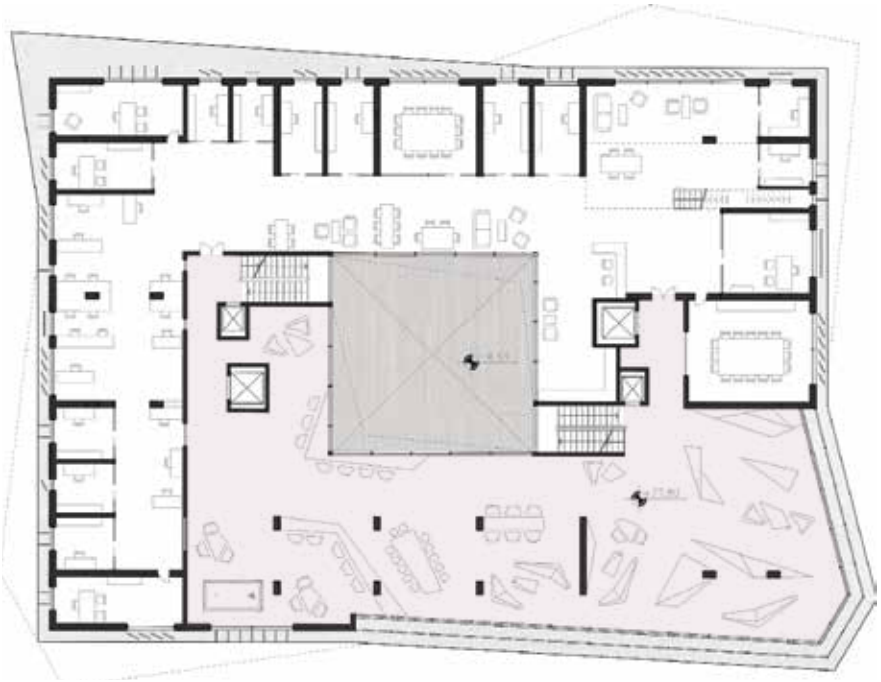
GROUND FLOOR 0,00m

FIRST FLOOR +3,65m

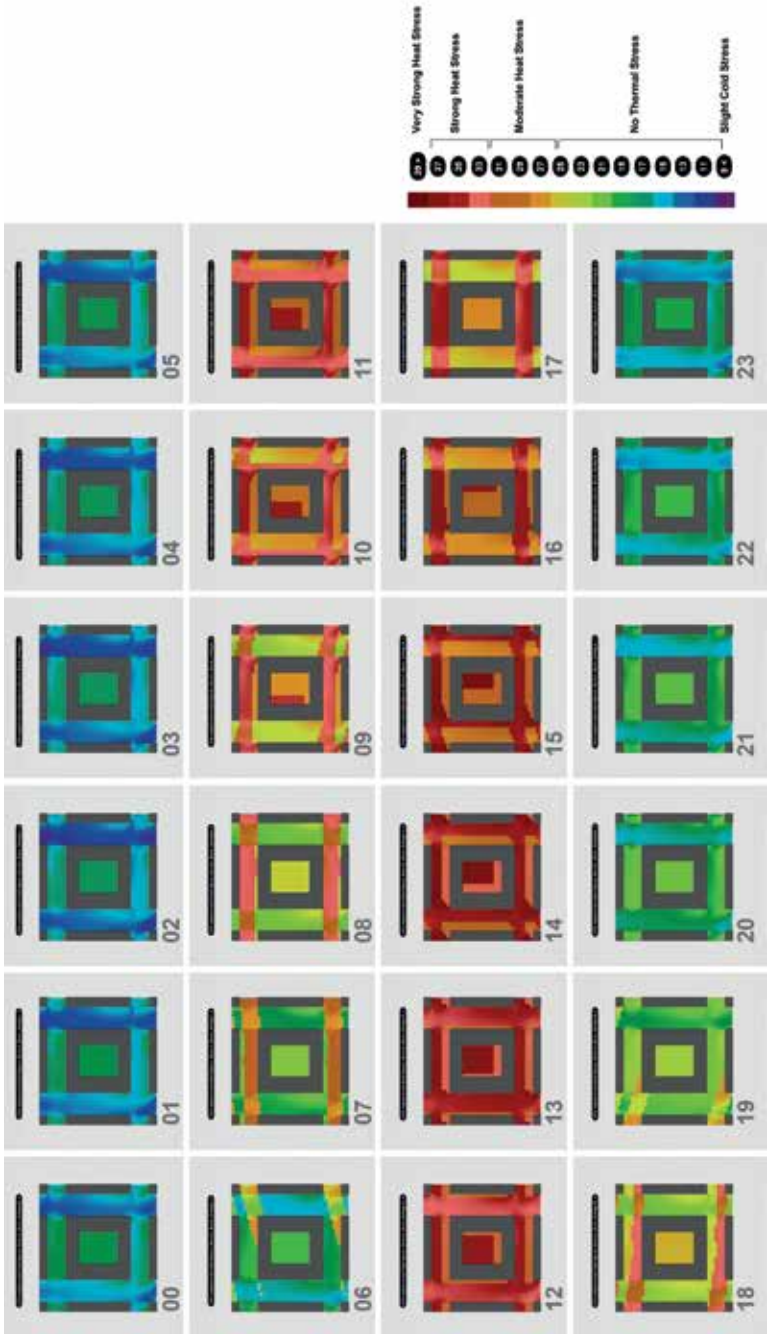
market building · shops & services · library · cafes · kindergarden

PRIVATE — SHARED





3 PERFORMANCE



[6] MIRCO CLIMATE MAPPING // ATA CHOKHACHIAN

BEYOND THE COLORFUL MESH

Ata Chokhachian

Cities always have been considered as living structures and entities with complex metabolisms in different scales and time periods. Designing and programming a liveable city demands a better understanding of desires within society and people, over a wide range of time sequences, in order to give them qualities to stimulate urban and public spaces. Indeed, discussing qualities in general could be a never-ending challenge, since qualities are always subjective phenomena. Jan Gehl, in his book Cities for People [1] states that, looking for qualities in urban settlements could be achieved by bringing protection, comfort and enjoyment by well-informed design decisions. Even though, transforming qualities into performance indicators could be a substitute translation to give a more understandable sense and scale to measure and realize assets of liveable urban spaces.

Cities have always shaped the buildings within them, and at the same time the buildings have shaped the cities. Within this coexistence of cities, built environment and people, connections and public spaces are like relief points of cities. The main question within this context is; how to design buildings and urban spaces to maintain determined qualities of indoor and outdoor living spaces? And how do designers know their design is going to perform like they think it will?

One of the main challenges of recent times in the context of architecture and urban development concerns including performance, not just as an additional factor, but as a main goal to achieve by design proposals and solutions. In this way of thinking, performance factors are in the body of the project, from the beginning stages of the design process in planning and form-finding steps. The initial idea of structuring design studios with the idea of highlighting living qualities, began with a project in Vienna in collaboration with the University of Applied Arts. ‘Energizing Vienna‘ was one of the first attempts to implement tool-oriented decision making in the early stages of design. The main goal and concern within this process was always about informing de-

sign decisions with the body of knowledge beforehand. The scenario is not only about using tools and running simulations; however, the discussion was based on increasing capabilities of the studio participants to be aware of the environmental impacts of their design decisions and proposals in the built environment from the outset, by applying, testing, analyzing and optimizing their design proposals into suitable contextual solutions.

Establishing design processes based on computational tools is a stimulating process that could always be heavily criticized. Nowadays, there are a considerable amount of designers and architecture students who love to use computational and parametric tools. However, it is important to bear in mind that, not using a simulation tool is preferable to using a tool without understanding the underlying models and limitations and basing further design decisions on invalid data.

To clarify the discussion, let's have a look at the definition of computational design. There are two common terms that are used interchangeably; computational design and computerized design, and we have to differentiate them, since the expression of computerized is much more limited than computational approaches. Here the question is, what is computational design? Michael Kilkelly argues that:

"Computational design is the application of computational strategies to the design process. While designers traditionally rely on intuition and experience to solve design problems, computational design aims to enhance that process by encoding design decisions using a computer language. The goal isn't to document the final result necessarily, but rather the steps and processes required creating that result." [2]

The fact is that such an approach is the demand and necessity of the new era, however the question and challenge is how to face or phrase this necessity. In general, there are two main approaches towards the phenomena of ‚computationalism'. The first and most popular one is a form-driven approach, where the building or urban form takes the main responsibilities. We can find support for this idea by looking at the Parametricism movement, or even architecture styles proposed by Patrick Schumacher in 2009 as a new global style for architecture and urban design [3].

The second approach is so called 'knowledge-based' design approach. In this approach or process the idea is to inform built environment or materialize it with a set of processed information. The main difference with the first group is the evolution of information from pure data into knowledge to support decision making at every step of the design process. This method requires a completely different way of thinking through the process of design, which brings the concept of design thinking into the agenda. And if we merge the idea of computational design with design thinking approaches the solution could be addressed by the concept of ‚parametric design thinking'[4]. This approach tries to inform the process of design with possible computational tools, according to complexity and the scale of the project to support decision-based solutions. Computational design tools make it easier to simulate building performance through the design process.

These days, nearly every architect uses a computer, whether for simulating, drafting, modeling, documentation or even creating spreadsheets of the projects. Architects and designers now need to know almost as much about tools and programs as they do about building codes, structures, and materials. But the reality is that not everyone has the time or patience to learn computational tools, which are most of the time a bunch of codes. Fortunately, there are new tools available (visual programming interfaces such as Grasshopper or Dynamo) that convey the power and flexibility of programming without the need for traditional text-based programming. This could make the task clear that, the challenge in the near future for all architects, students and even instructors, is to face reality. As our tools are becoming more complicated and powerful, we need to develop our design processes consequently in order to stay competitive. On the other hand, most of the problems we have to solve within the design process do not fall into the capabilities of tools we use. So we have to adapt and customize our tools to the way we work, or even sometimes we have to think the way our tools work. Each project is unique with its own challenges – there is no one piece of software that can do everything we need it to. However, by creating our own tools, we can tailor our software to work for us.

Occasionally, there is friction in the coexistence of tools and architecture design processes. Recently there was a blog discussion between two computational design activists from an architectural standpoint: Nathan Miller [5] of Proving Ground and Konrad Sobon[6] of HOK Design Technology Specialist. The key points of the discussion helps to better understand and clarify where and why we need to include computational design to our work:
First it should be noted that computational design is not for everyone and it has to end up with solutions, otherwise the process should be questioned. Second, while computational design is made possible by technology, it should be thought of first as a problem-solving methodology. Third, computational design is not BIM [7]. BIM is also not computational design. That is not to say they are incompatible processes. Nor is this to say that when thoughtfully combined they cannot greatly enhance a design workflow. Finally yet importantly, computational designers should just be designers who have a different approach to design processes.
As we already recognized, computational design is a broad term that encompasses many activities, ranging from design generation to task automation. The common approach is the use of a visual programming tool. There are couple of directions that your design process can benefit from including computational tools and thinking methods. This approach will give you the possibility to explore multiple design alternatives with controlled inputs and outputs. This could be the starting point to automate repetitive steps or tasks within the process. For example, such as analyzing hundreds of cases within a short period (depending on computation power) with one correctly settled algorithm. This is where the designer has the chance to test how the design proposal is really performing, and this is possible by getting under the hood and understanding the correlations between inputs and outputs. This process of simulating, analyzing, justifying and adjusting goes on, over and over until it reaches an answer to the question that the design proposal is going to cover.

In summary, computational design requires a logical way of thinking in a step-by-step manner. Most architects rely on intuition and creativity to solve problems. This kind of problem solving doesn't always fall into a left-brained logical process. What if you could encode this perception? You could look at each step and really understand what makes the process work or even fail. By encoding the design process, each step becomes a series of instructions that can be evaluated, revised, and improved. At the end of the day, the whole scenario can be a double-edged sword, with pros and cons, and those who have the adequate knowledge to support the tool they use, from modeling up to presenting, will benefit. Ultimately, it is always better to question the reliability of the tool, as well as the output information, in order to understand the facts and improve the design alternatives within the whole process.

[1] Gehl, J. (2013). Cities for people. Island press.

[2] Michael Kilkelly, April 2016, http://archsmarter.com/computational-design/

[3] Schumacher, P. (2009). Parametricism: A new global style for architecture and urban design. Architectural Design, 79(4), 14-23.

[4] Chokhachian A. (2014). Parametric Design Thinking: A Paradigm Shift for Architecture Design Process, Germany: LAP LAMBERT Academic Publishing, ISBN: 978-365-9556-61-6.

[5] https://provingground.io/about/nathan-miller/

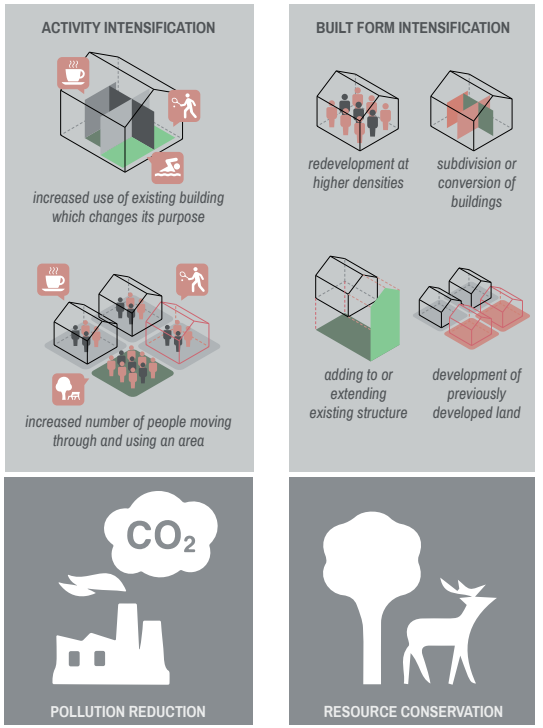
[6] http://archi-lab.net/sample-page/

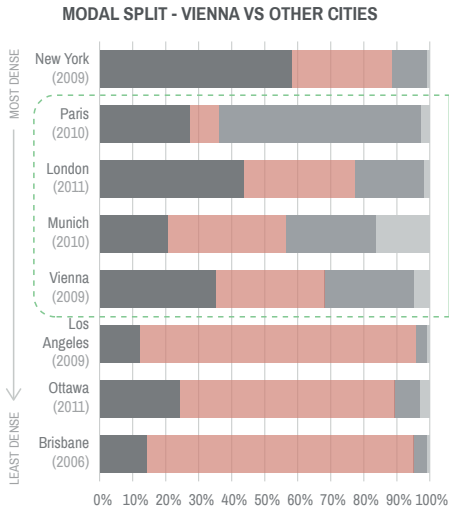
[7] Building Information Modeling

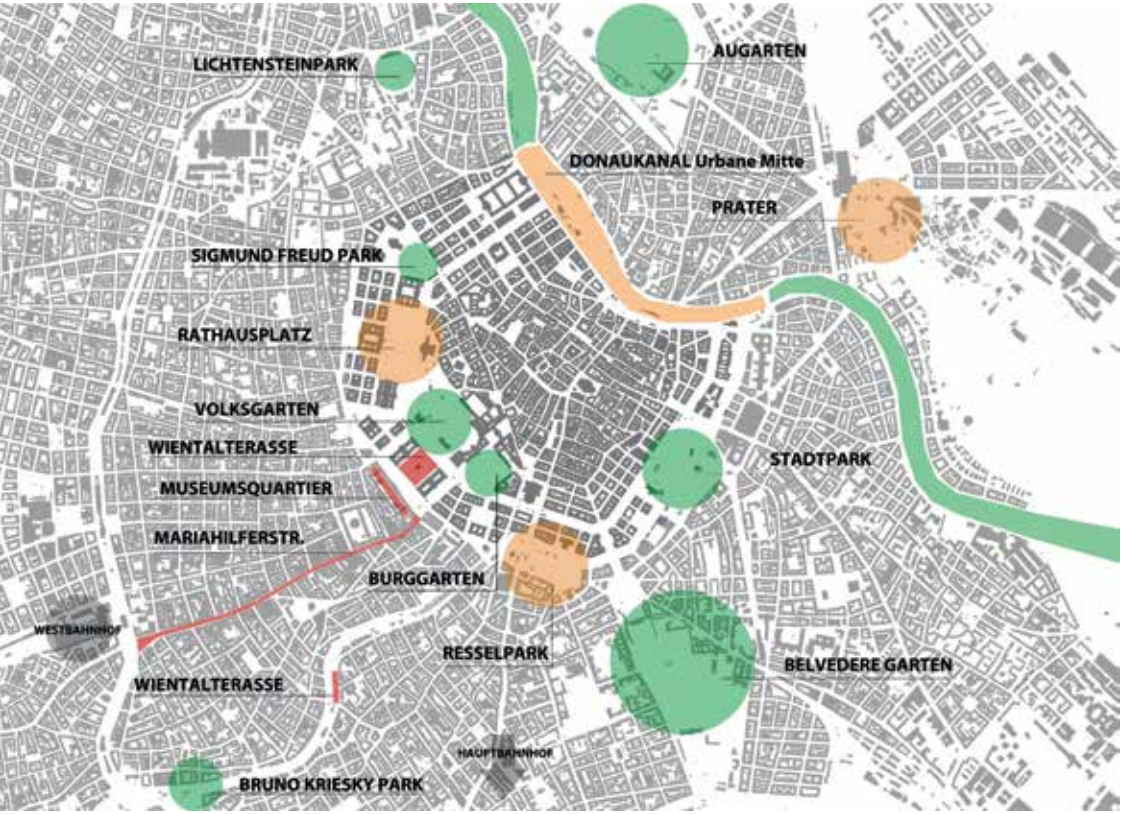
3.1 ENERGIZING VIENNA

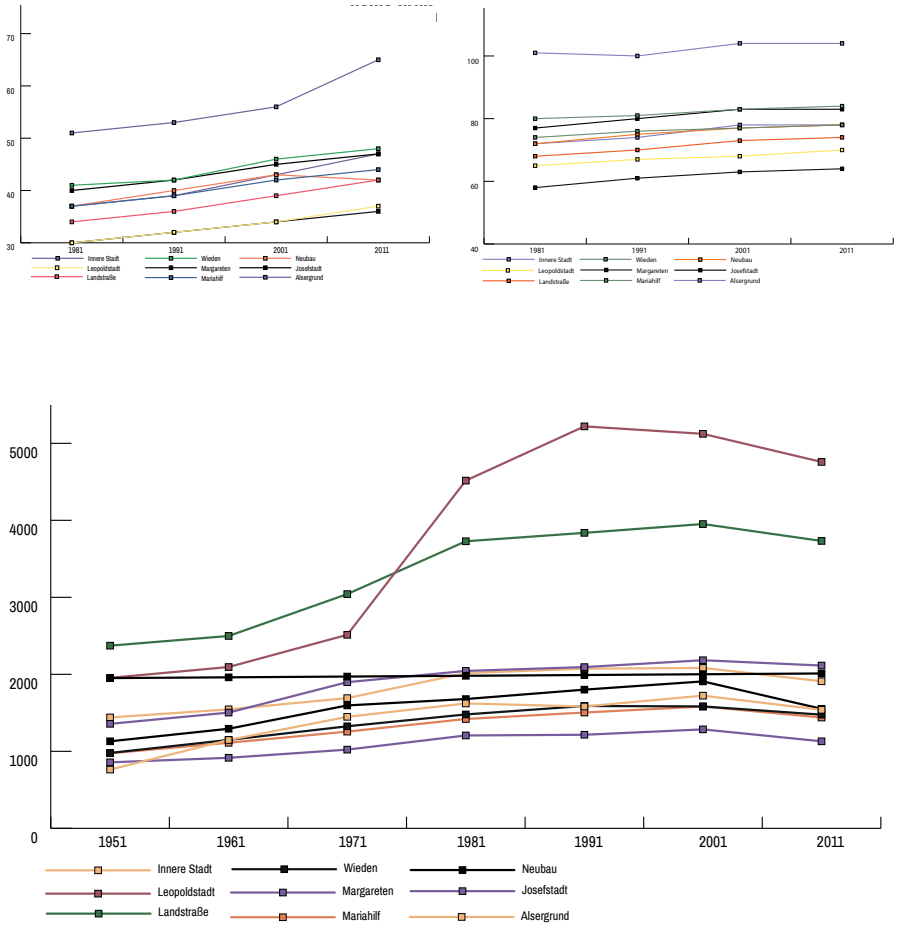
DENSIFICATION

CONTEXT

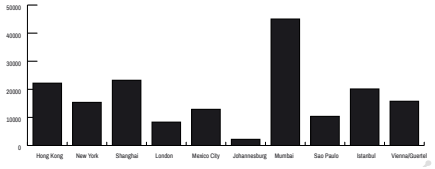




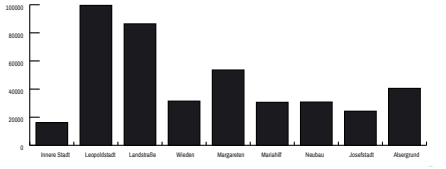




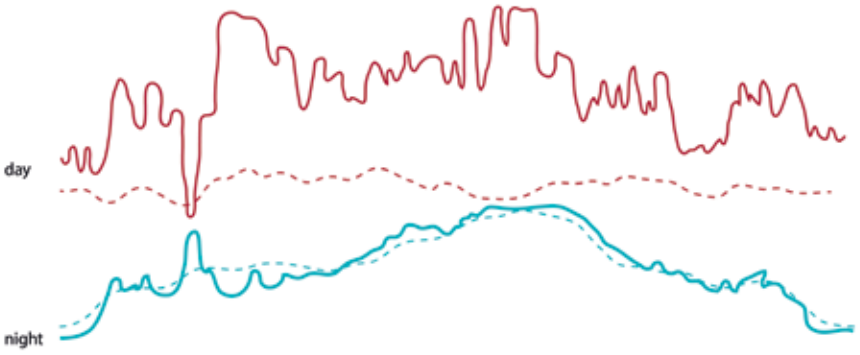
Development of building stock in Vienna 1951-2011

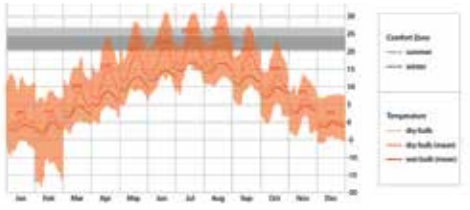


Livind space conditions in Vienna and other cities

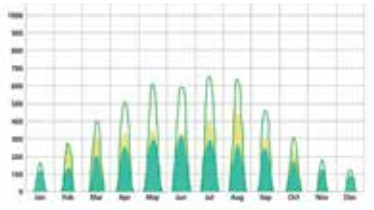


Population in Vienna by district in 2014

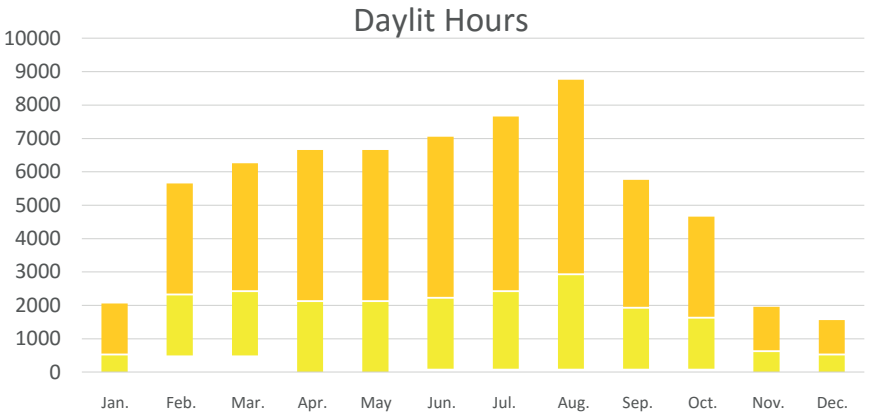


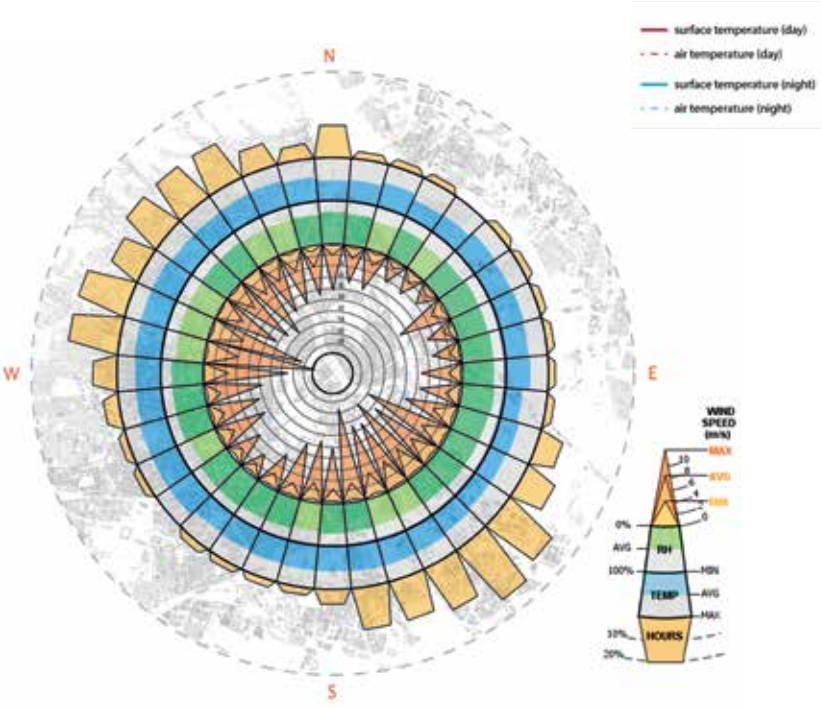


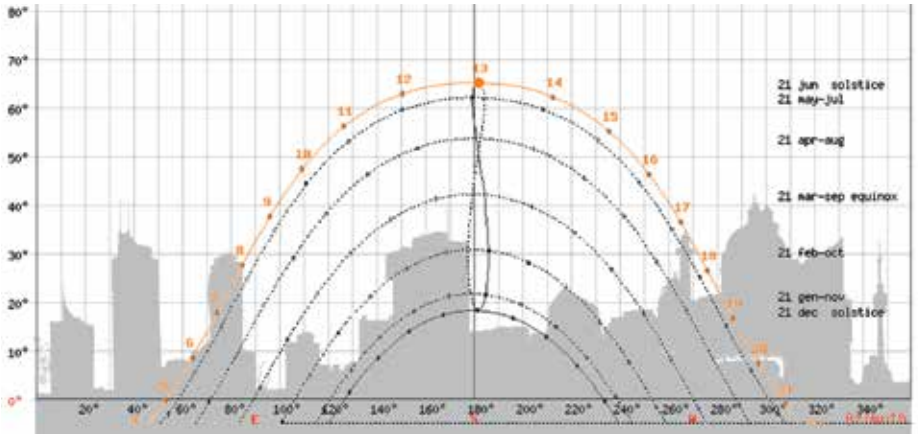
Annual temperature

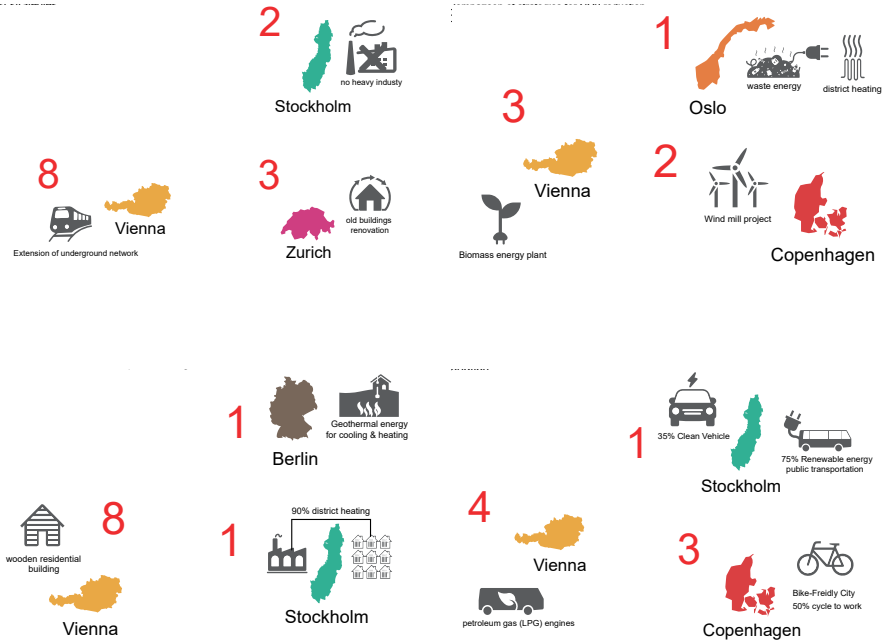


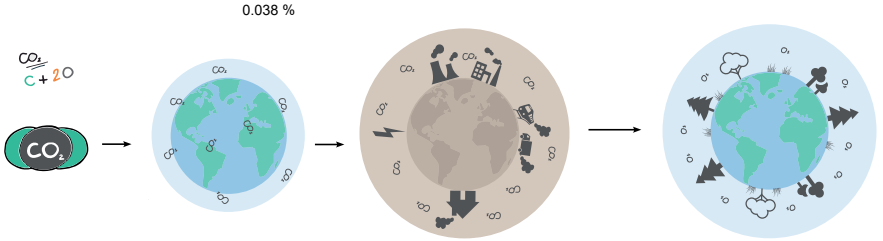
Annual radiation



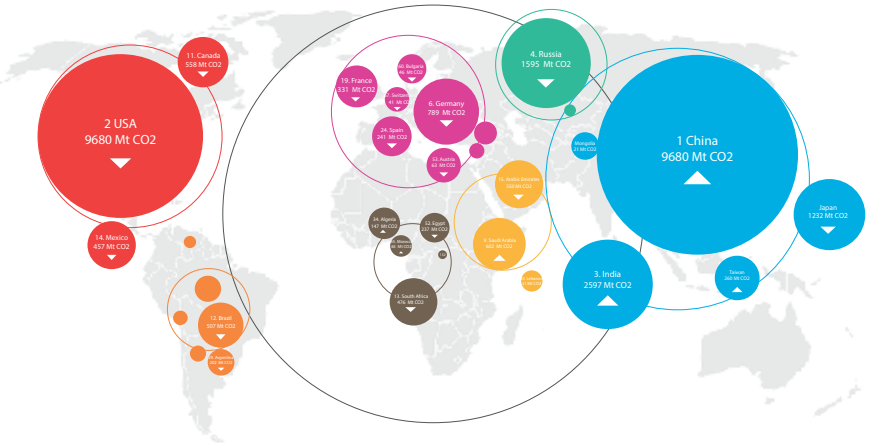




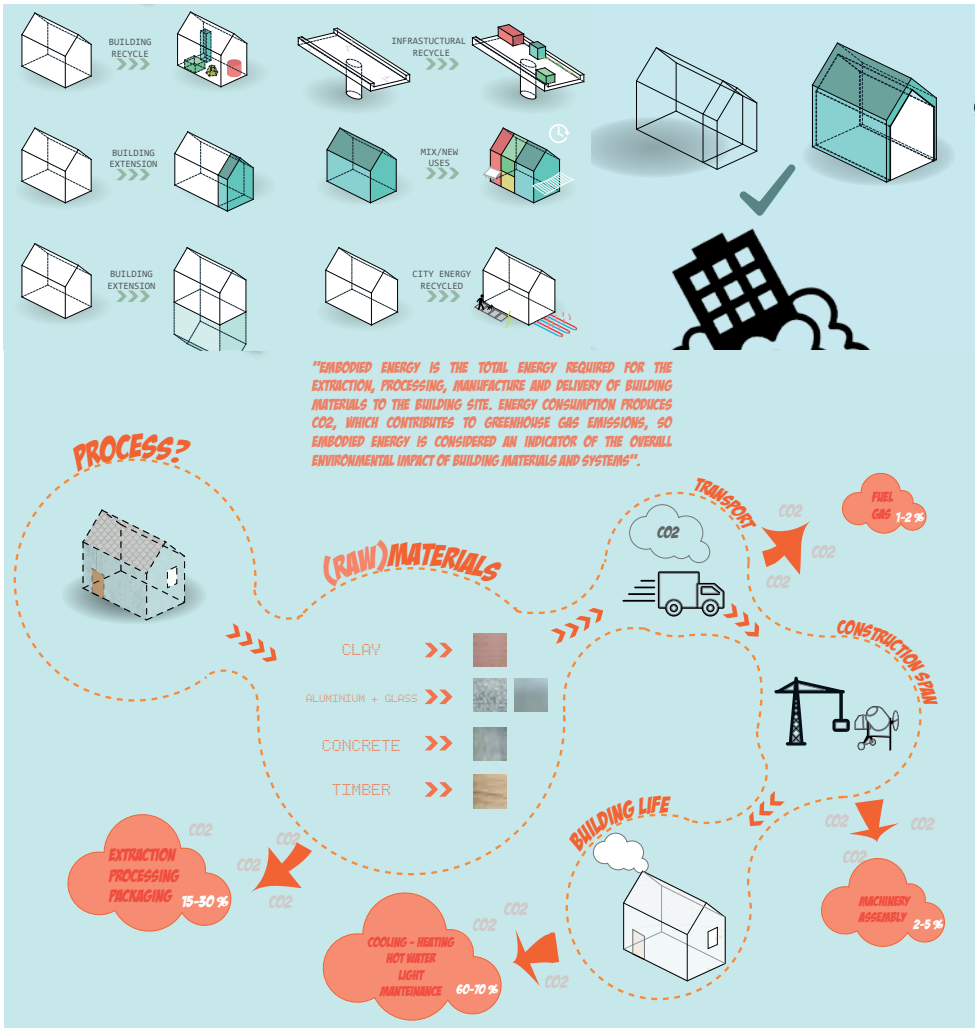

2
no heavy industry
Stockholm
1
waste energy
district heating
Oslo
3
Vienna
Biomass energy plant
8
Vienna
Extension of underground network
3
old buildings renovation
Zurich
2
Wind mill project
Copenhagen
1
Geothermal energy for cooling & heating
Berlin
1
35% Clean Vehicle
75% Renewable energy public transportation
Stockholm
8
wooden residential building
Vienna
1
90% district heating
Stockholm
4
Vienna
petroleum gas (LPG) engines
3
Bike-Freidly City
50% cycle to work
Copenhagen


0.038 %
C + 2O
CO2


natural shading
CO2
Shared space
CO2
ventilation
CO2
mixed-function
CO2
house orientation
CO2
cycling & public transportation
CO2

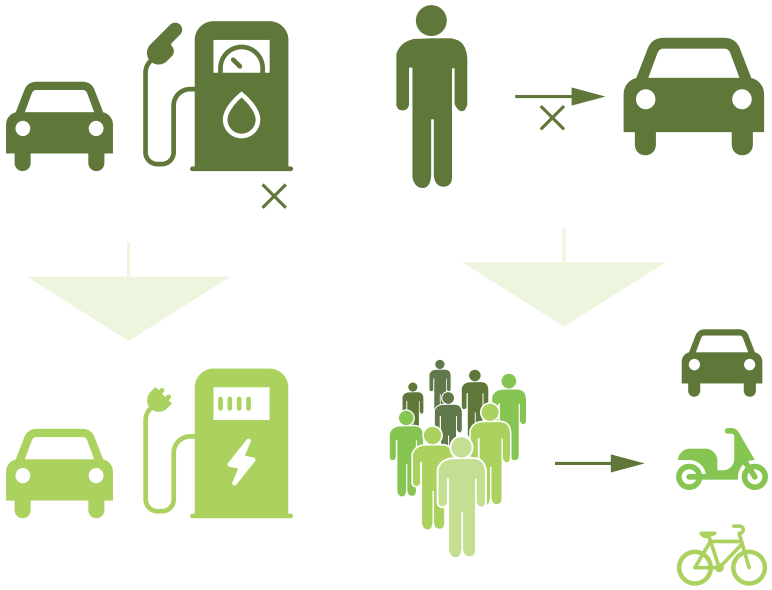

2 USA
9680 Mt CO2
1 China
9680 Mt CO2
4. Russia
1595 Mt CO2
3. India
2597 Mt CO2
Japan
1232 Mt CO2
6. Germany
789 Mt CO2
11. Canada
558 Mt CO2
14. Mexico
457 Mt CO2

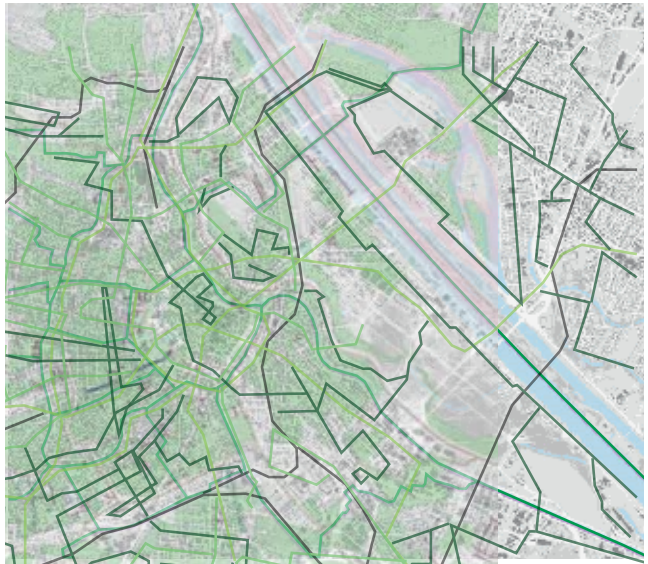
DENSIFICATION - EMBODIED ENERGY



URBAN MOBILITY, TRENDS & VISIONS

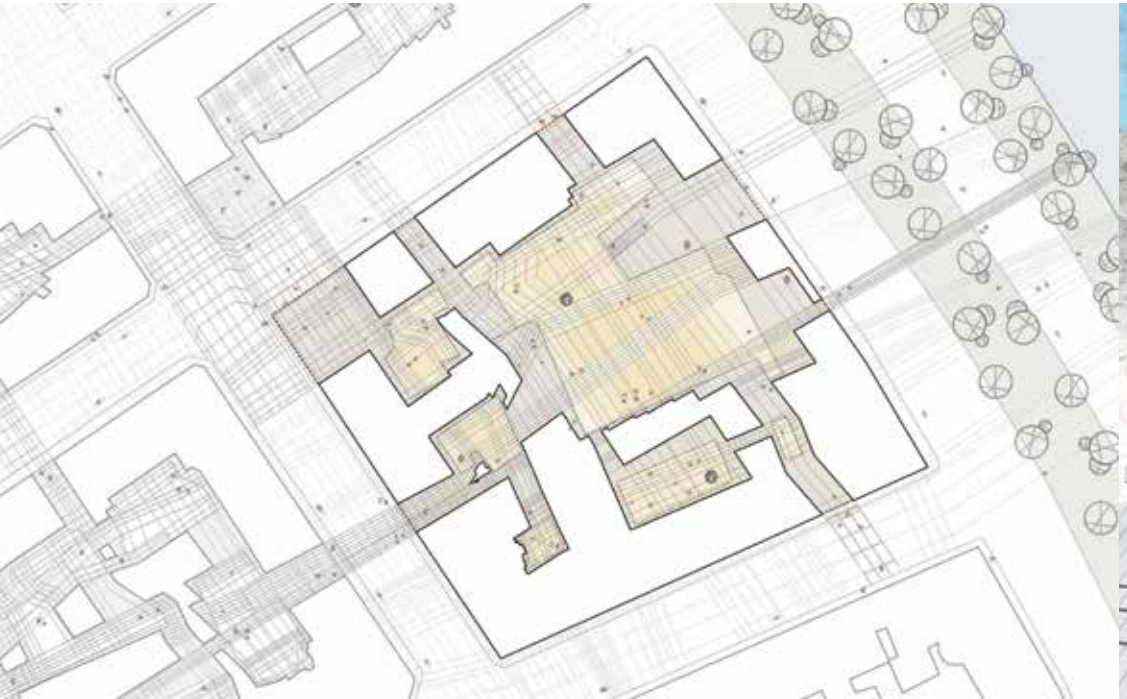
CONTEXT

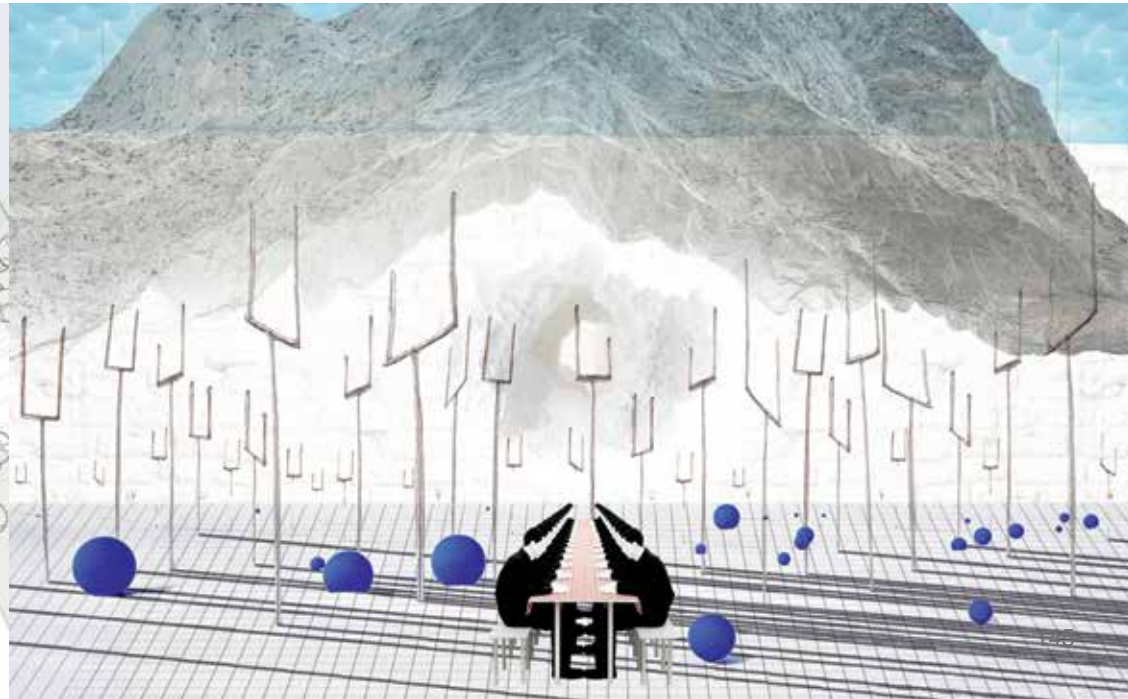




ENERGIZING VIENNA

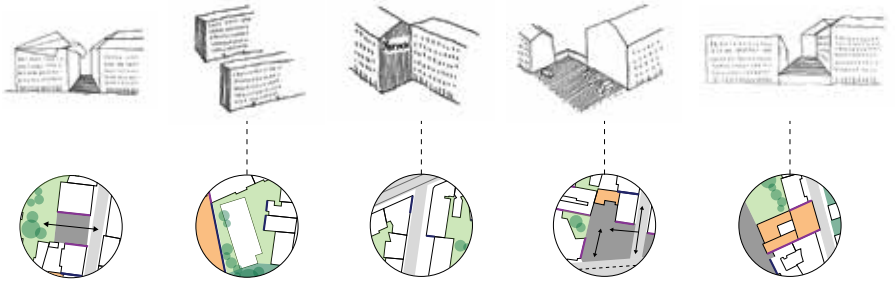
CAMILA BECCAR VARELA
DIEGO BUONANNO
TEODOR DUHNEV
FRANCESCO MARANGI





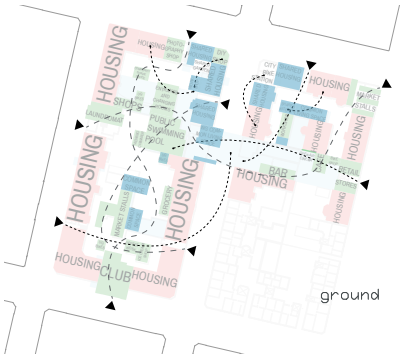
EXTREME JUNK SPACES

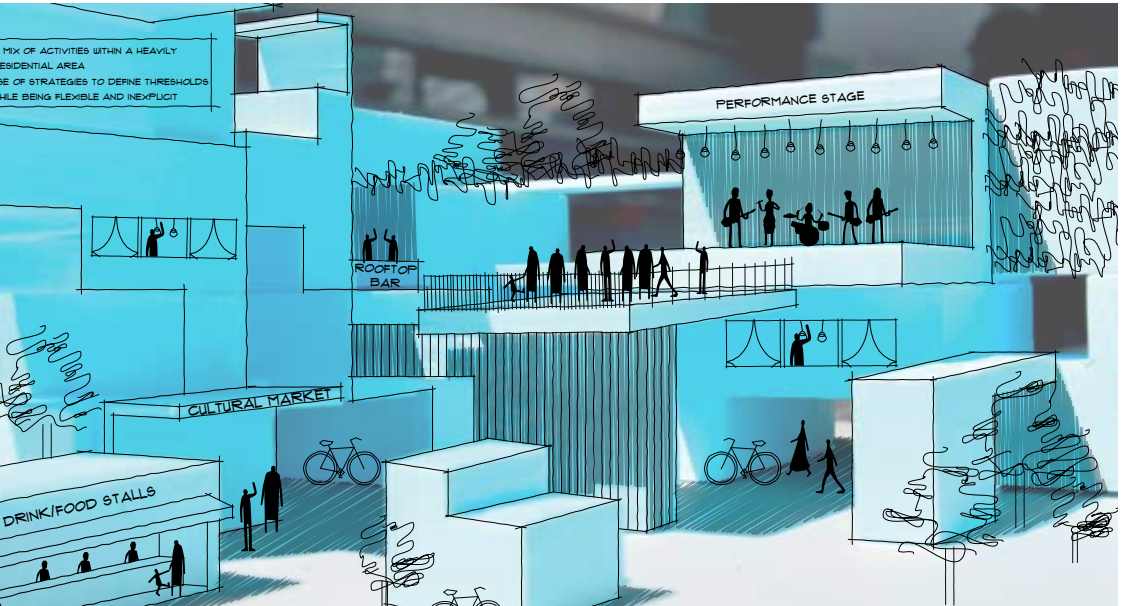
PEROLA BARBOSA
MORITZ BOECHER
ANDREA VESELA
GENEVIEVE WALSHE

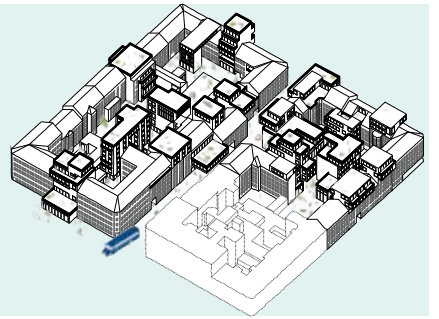


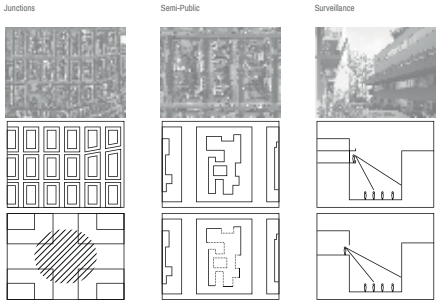
NOTTAKRING

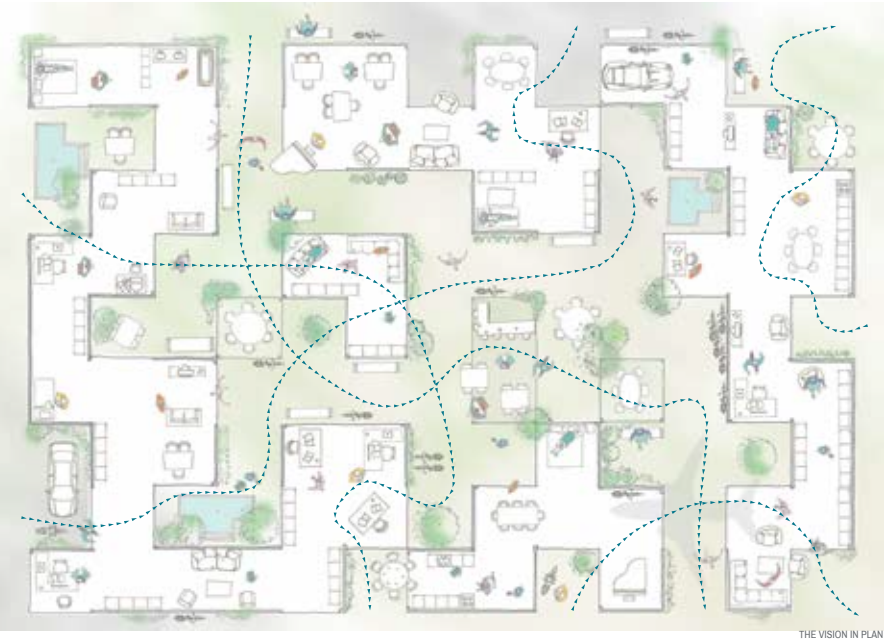
CLAIRE O'SULLIVAN
JEANNE EUNICE SISON
ZOE BLANCHOT
GEORGIA PERDIKOURI PAPADOPOULOU



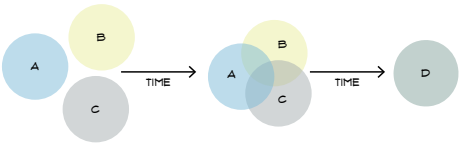








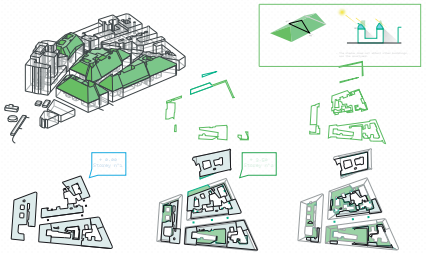
THE VISION IN PLAN

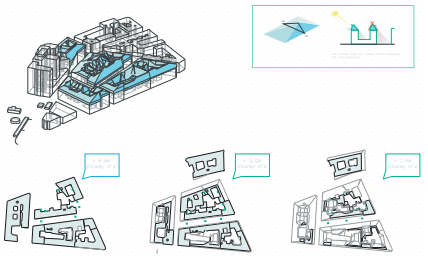


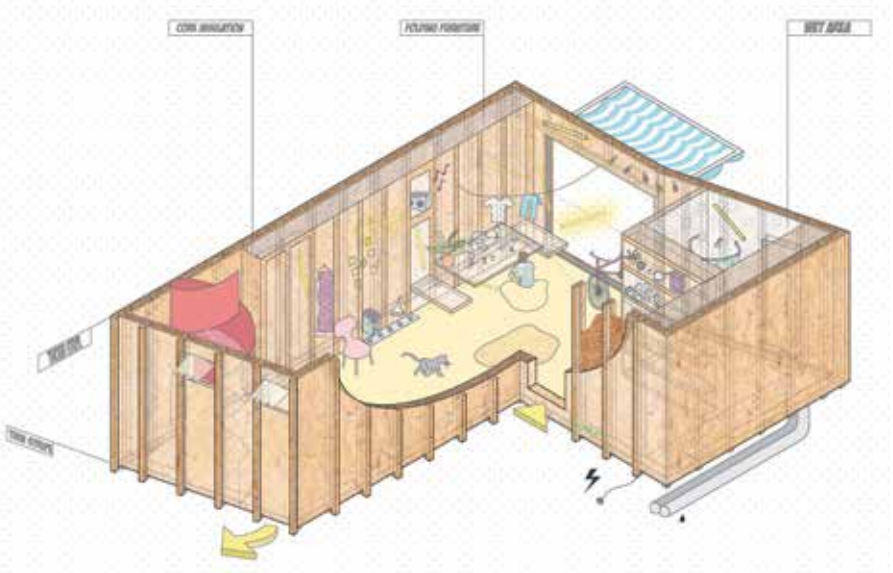
ambiguity of thresholds creating new uses

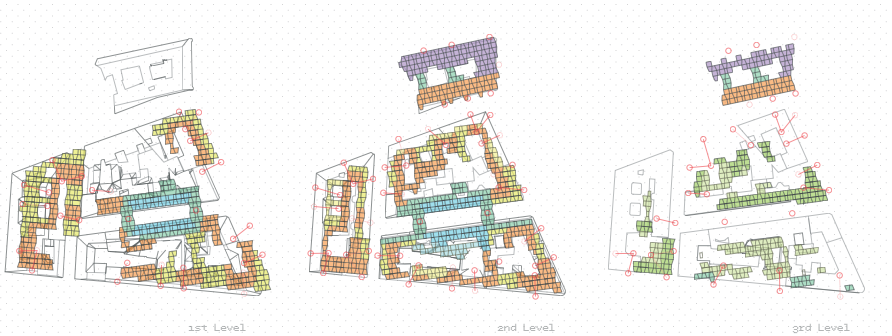
WIEN BNB

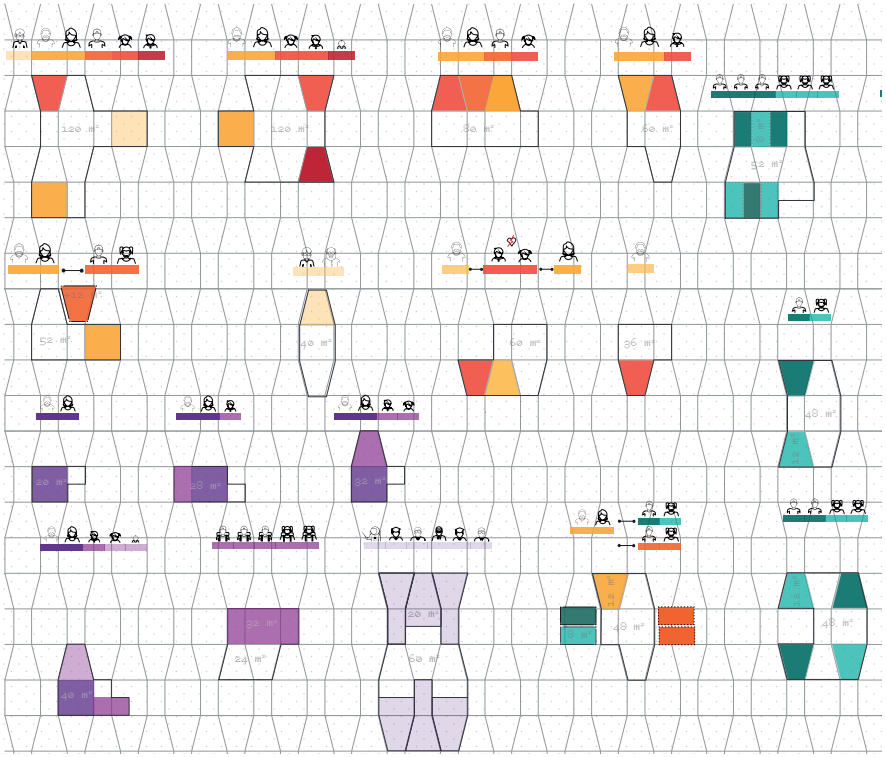
ÀLVARO GÓMEZ
ANDREA OCIU,
CRISTINA MARCO
MANUEL JESÚS PÍRIZ









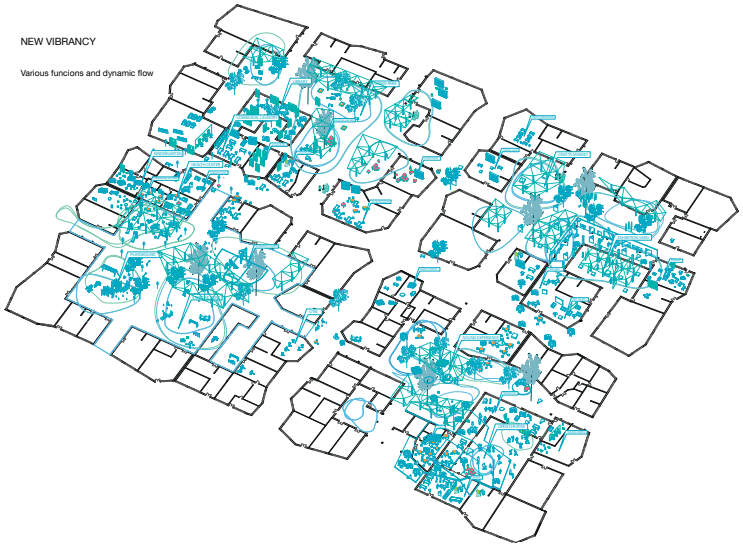


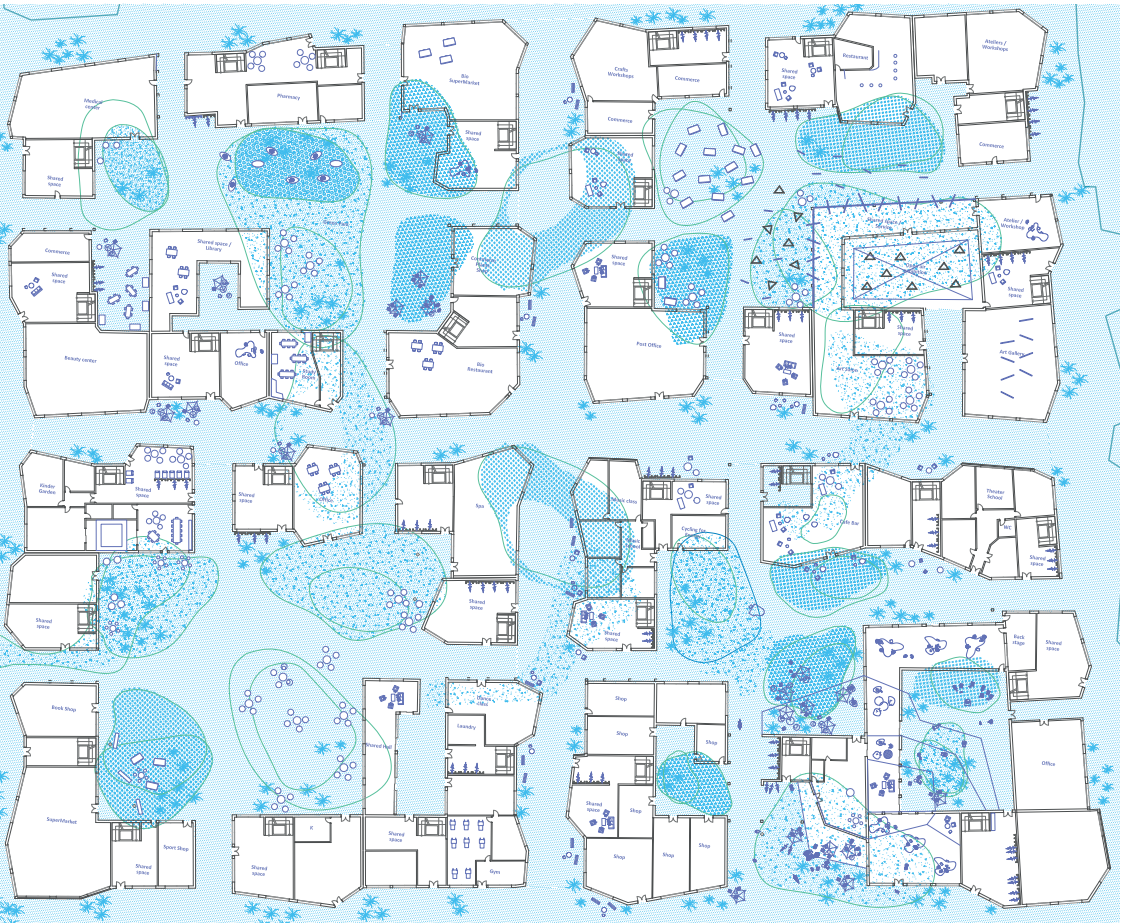
URBAN INVERTION

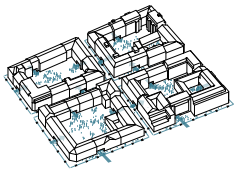
DAVID CHEN
KATIA MOUALEK
KRISTINA STEFANOVA
FENG WU

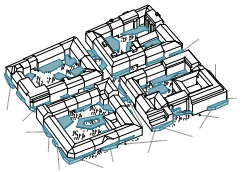
NEW VIBRANCY

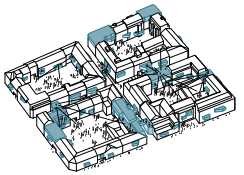
Various funcions and dynamic flow











Existing functions

Integration of new functions

Amplifying the proximity of functions

[7] DANIELE SANTUCCI

INSPIRED BY CURIOSITY

Stefan Behnisch

The choice to have the students analyze and rethink the harbor of Stuttgart was made on the basis of several local and global aspects. We can all expect that cities will continue to grow – that more and more people will move to urban centers, and will decide to live and work there. A manifold of trends and social developments are leading towards a higher pressure on our cities, to densify, to change policies. Today, we are experiencing just the beginning, and already see freightening changes in politics.

Locally, a new generation of younger people is preparing to enter the working phase of their lives. They don't believe in commuting, don't believe in a stringent separation between work and private life. They want to live, to work, to play and raise their children in close proximity, they believe in projects, not in corporations, in group work not individual careers, in self-employment, not the safe havens of administrations.

Globally, we can expect more and more people moving between continents, abandoning areas where they can't see a perspective for their children, that wars rage, where education is jeopardized. We can't expect to live peacefully surrounded by barbed wire or walls, undisturbed by the misery around us.
All these factors paired with failed development policies force us to rethink the urban concept, abandon CIAM, and return to live-and-work neighborhoods.

This new generation, where status is redefined, lifestyle reconsidered, where cars are perceived as being a burden but occasional necessity, forces us to re-think planning policies. Together we, the teachers and students, saw this task as a great opportunity for so-called ‚practice-based research', where analysis and experiment, design and discussion lead to new and surprising solutions, shared with others, and to

be further elaborated and drawn upon. The students not only analyzed the situation, neighborhoods, people, ethnic backgrounds, and social organizations, but also traffic patterns and land use.

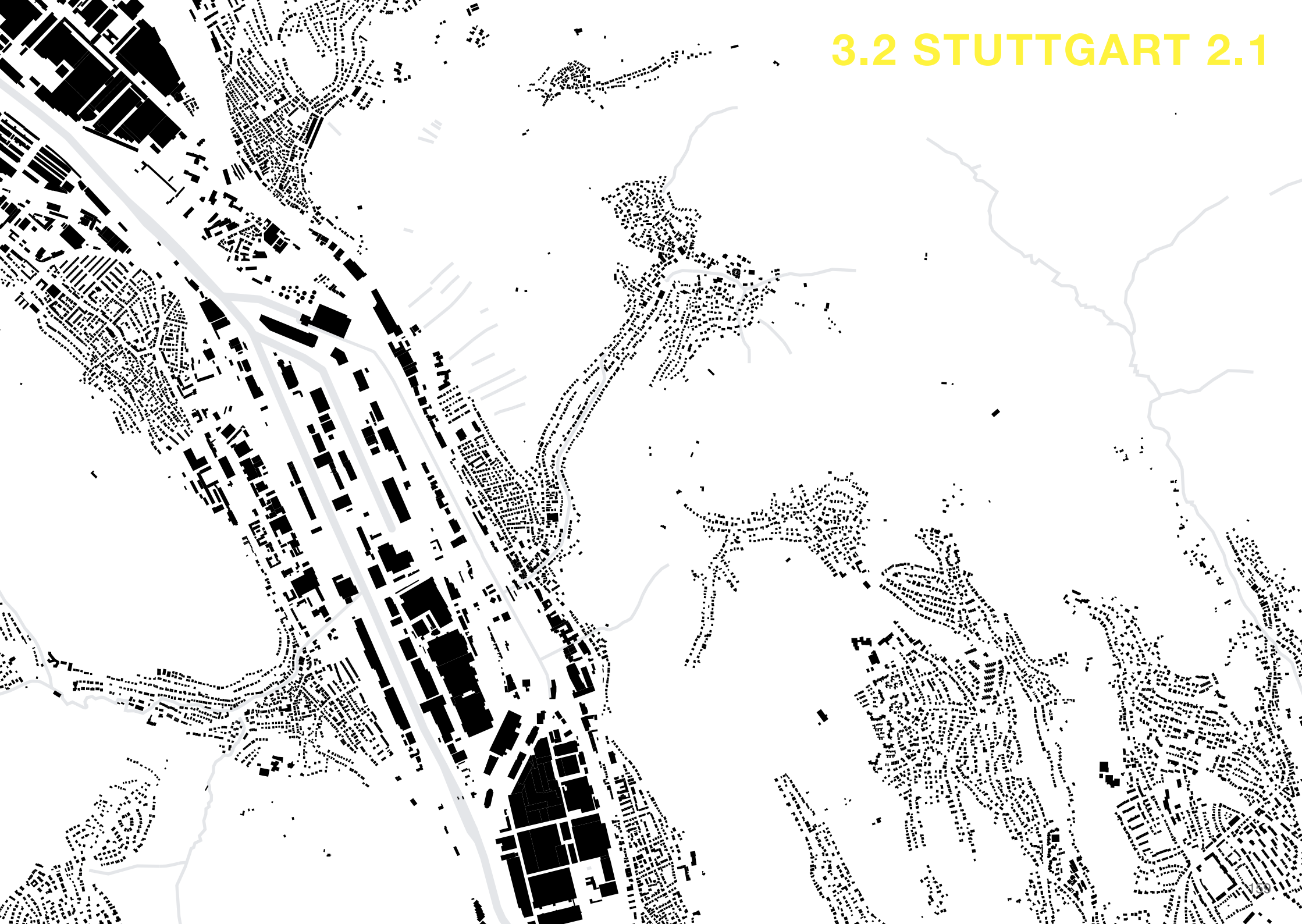
This harbor area is a unique opportunity for a city topographically, as Stuttgart is so confined.
However, there was a surprising amount of resistance from the city. Right now, this vast area is mostly occupied by storage facilities, wholesales markets, and many vacant areas. In general, goods for slow transport are stored there. Some, but very few transport vessels can be seen, on average fewer than five per day – during our time there we counted just one per day.

Situated at the river, relatively central, topographically almost idyllic, and surrounded by vineyards and small neighborhoods, one wonders why this has not been further developed. It is the largest undeveloped land area in close proximity to the city center. This only can be explained by some substantial industrial interest to keep the warehouses cheap, surprisingly supported by the city.

Stuttgart suffers like most German cities from a crippling shortage of affordable living space in the city. This will lead to economic problems, sooner rather than later. Highly educated people, as well as specialized and trained workers, may not be willing to commute long distances much longer. The everyday service sector necessary for a city with good living standards will experience problems, if people can't afford to live close by anymore.

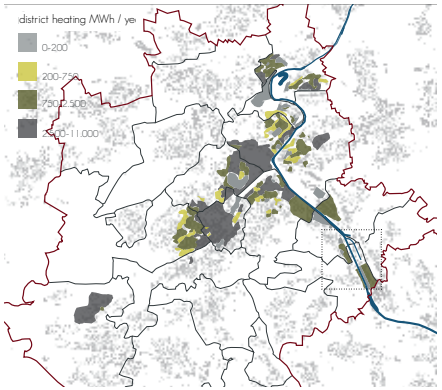
All these aspects led, after a thorough analysis and discussions, to several design approaches by the students. Many interesting and surprising concepts were developed, with this site becoming the nucleus of possible further developments.
Stuttgart is preparing for a international building exhibition. Developing this area could be a unique opportunity for the city to demonstrate a qualitative and conceptual new urban development.

3.2 STUTTGART 2.1

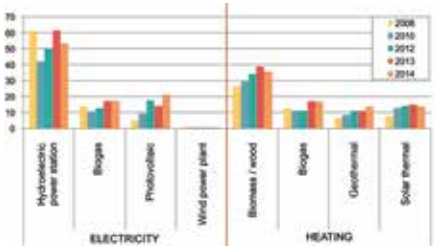


ENERGY FLOWS, SOURCES, GRIDS

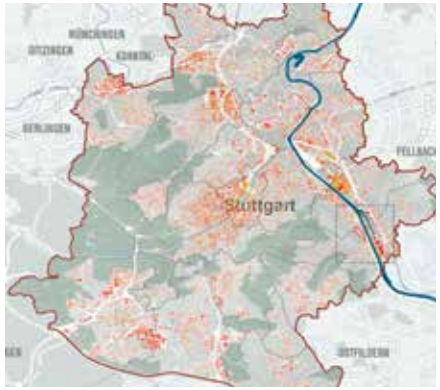
CONTEXT



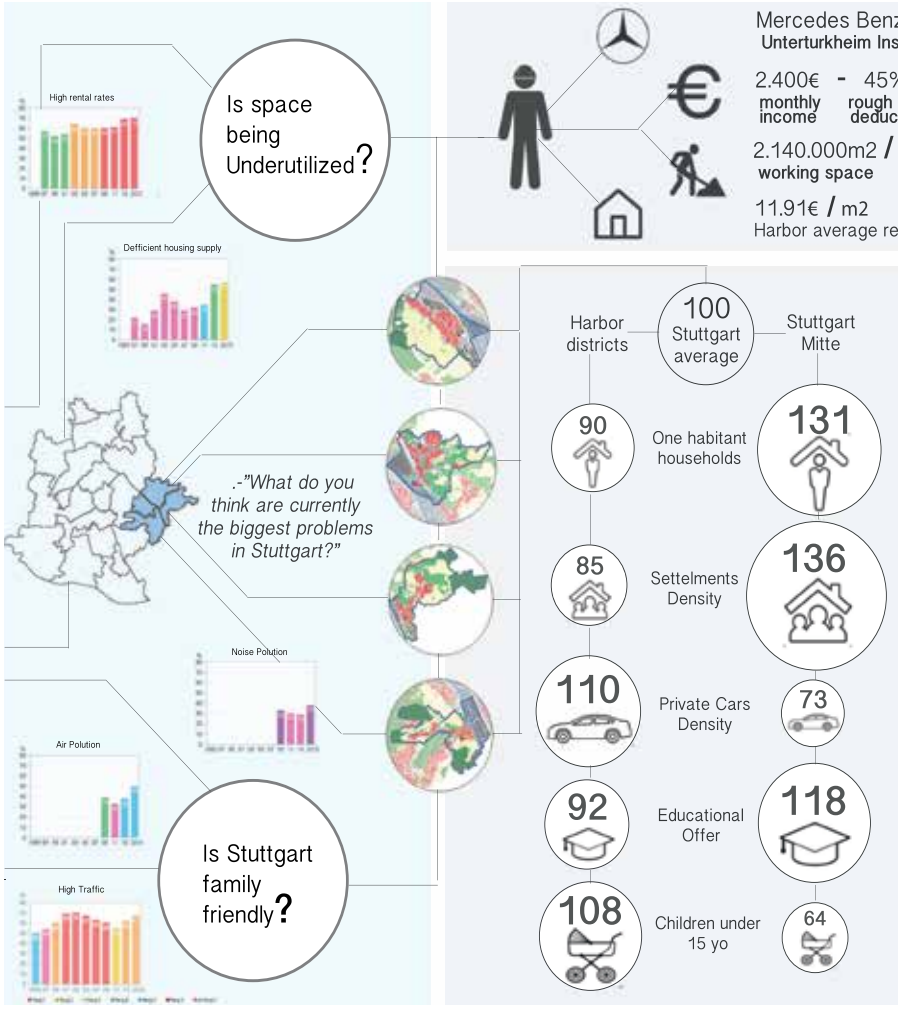
Energy consumption by sector and purpose



Sources of renewable energy in Stuttgart

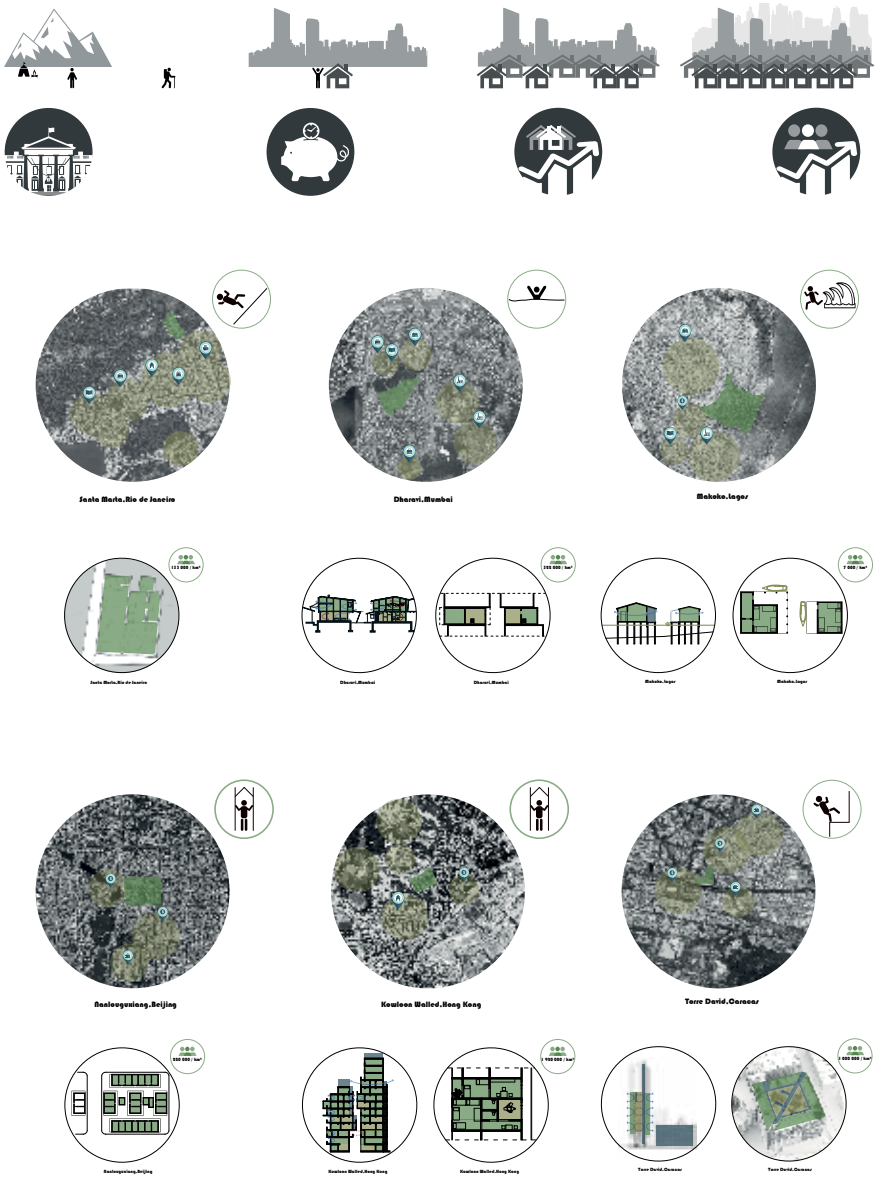


DEMOGRAPHICS



INFORMAL SETTLEMENTS

CONTEXT

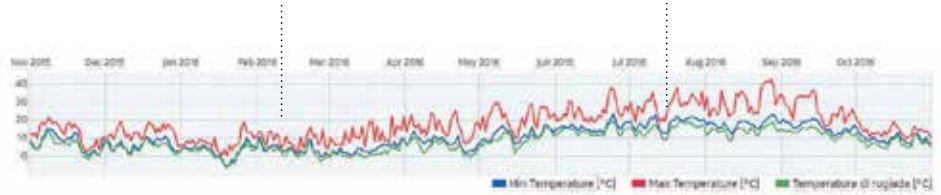


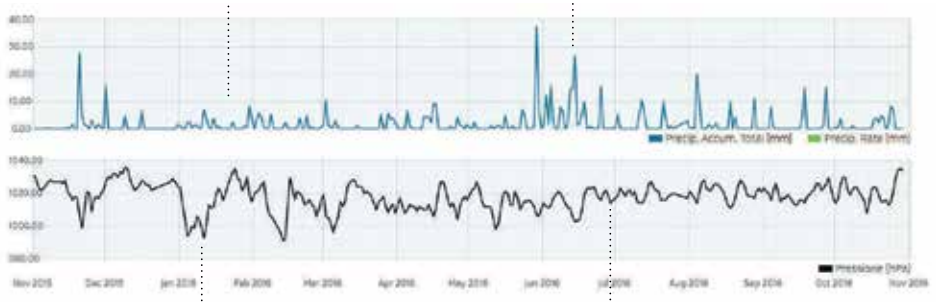
MICROCLIMATE & OUTDOOR COMFORT

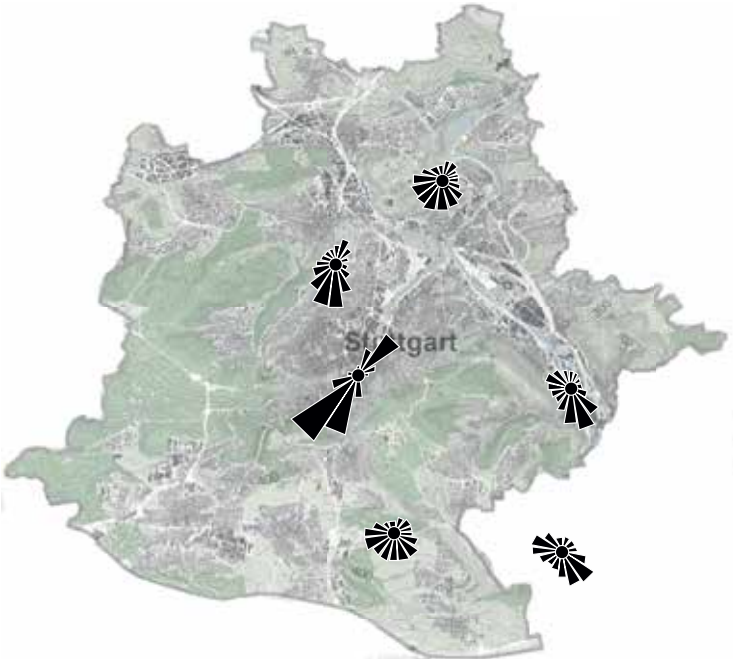
CONTEXT

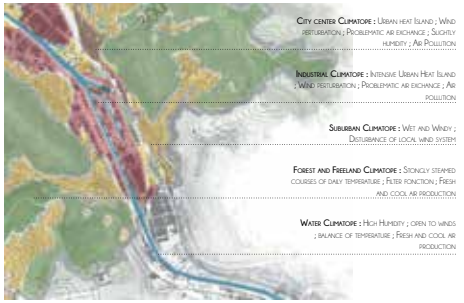
From October 31, 2015 to October 31, 2016

High	42.7°C	Total precipitation	630,4 mm
Low	-5,2°C	Minimum humidity	20%
Avg	14,2°C		



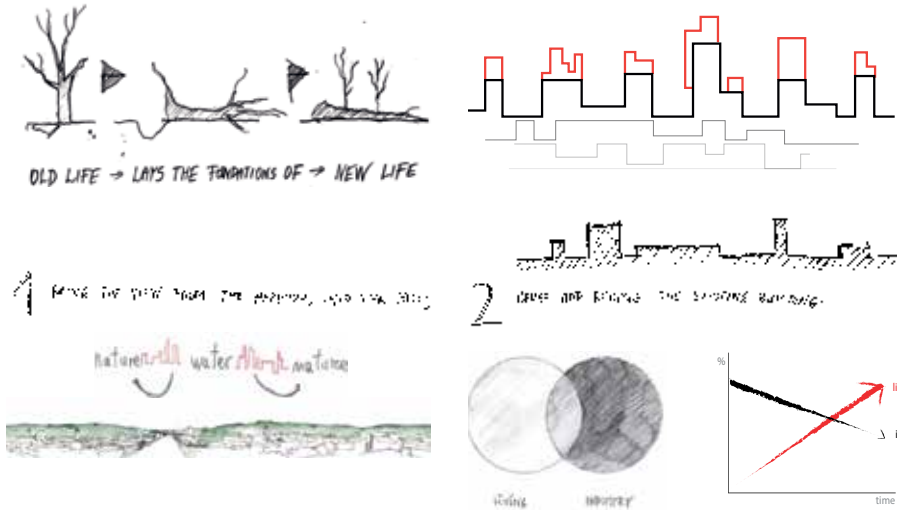


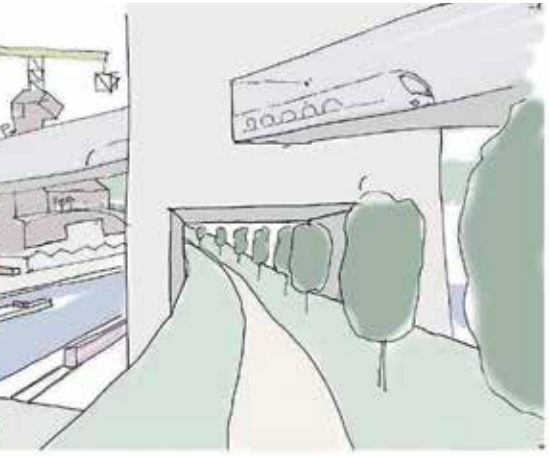


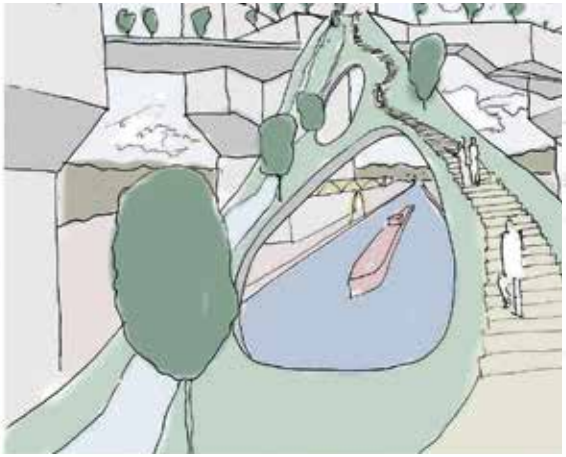


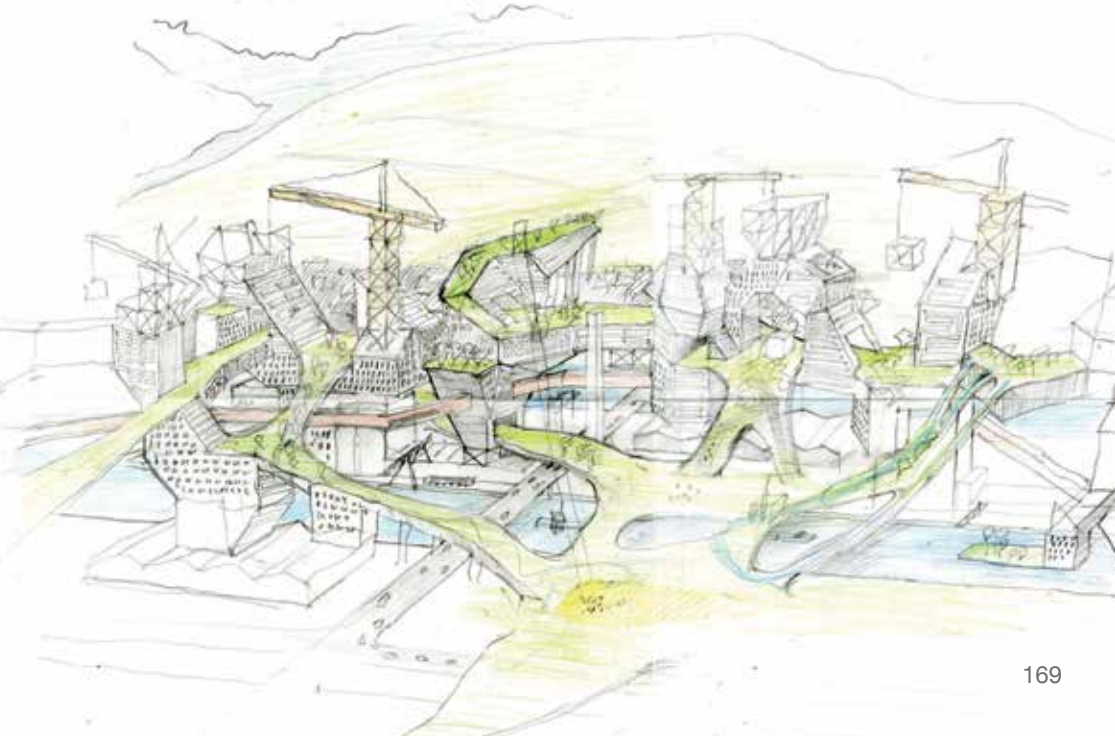
RHIZOME

EMILIE CHARRIER
CAROLINA FANELLI
FILIP HERMANN



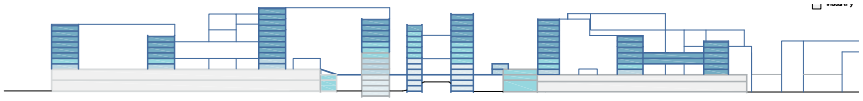


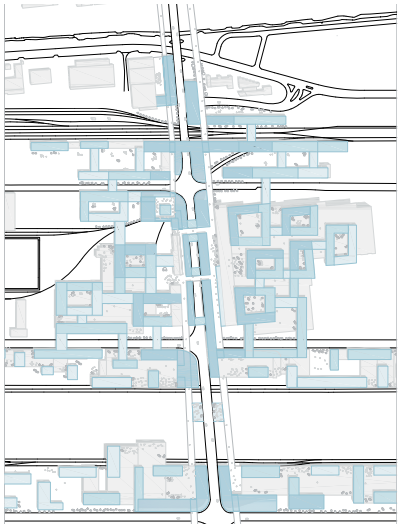


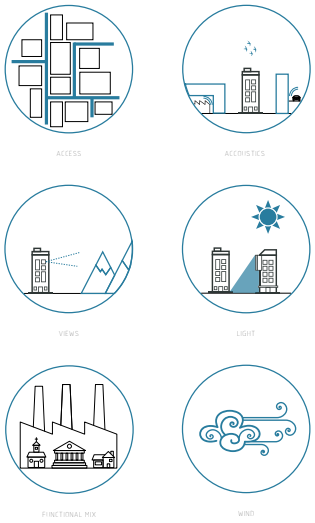


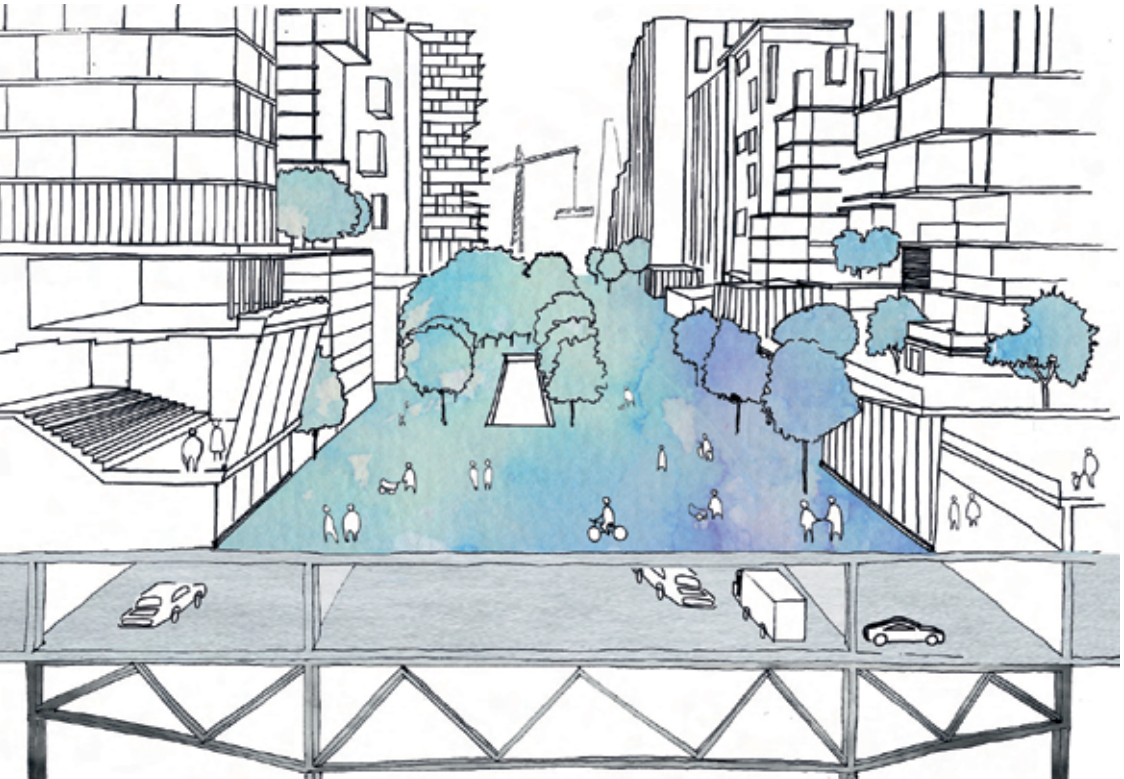
INFRATECTURE

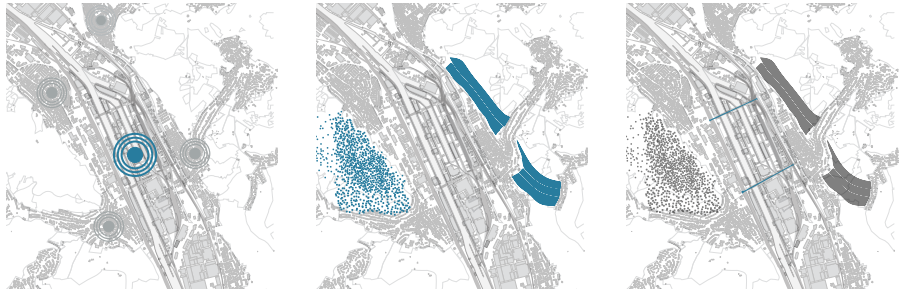
ELITSA BANKOVA
NIKOLINA PAVLOVA

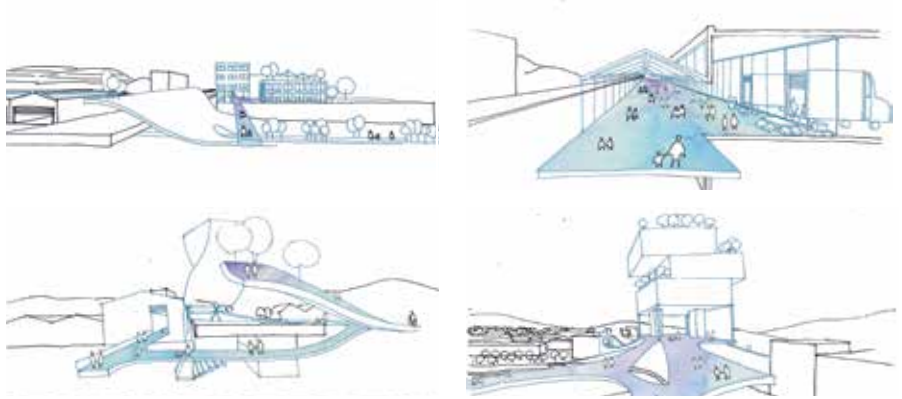


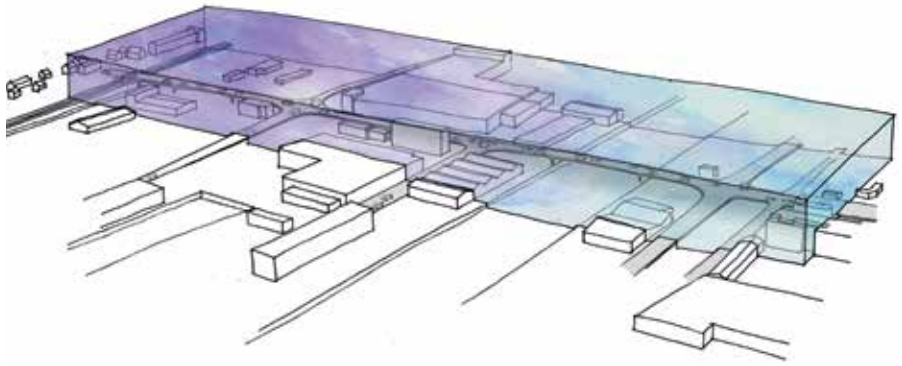






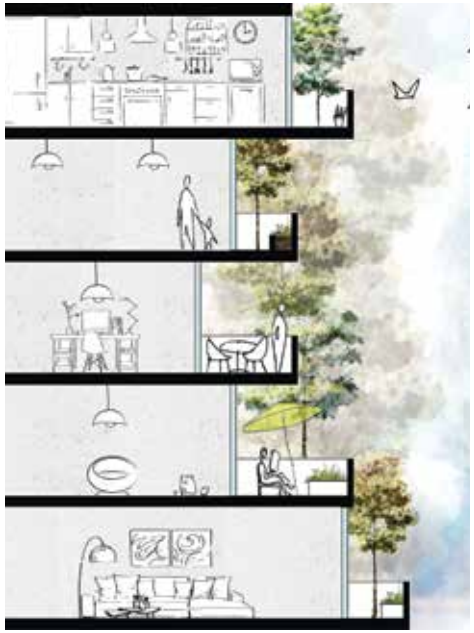


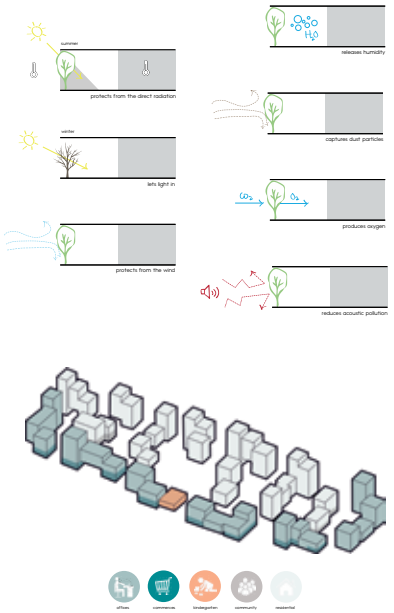


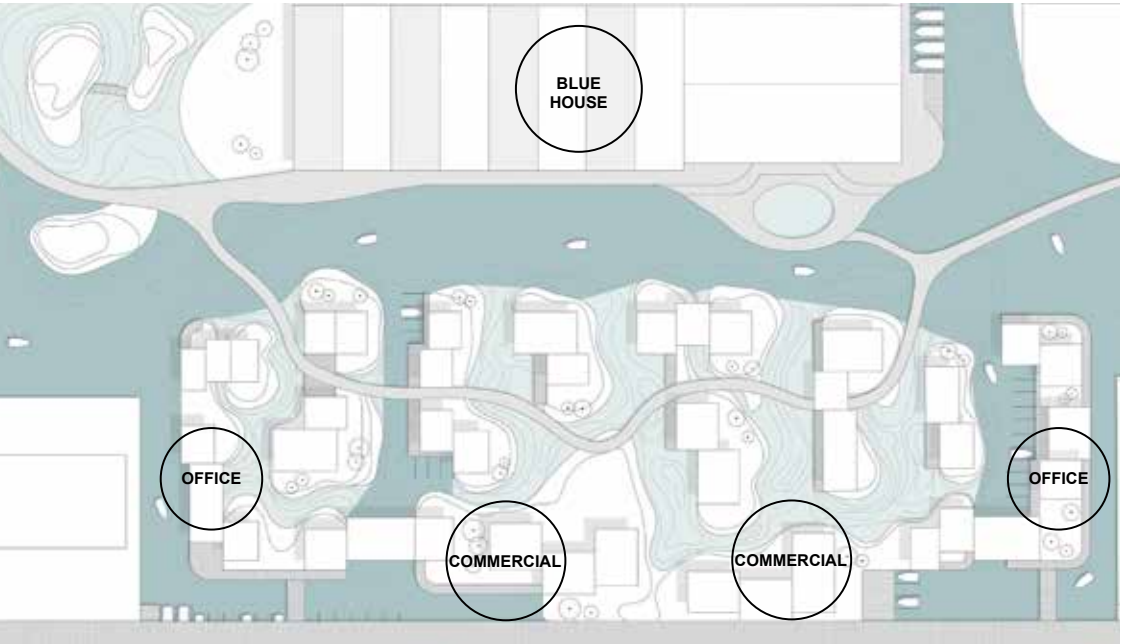


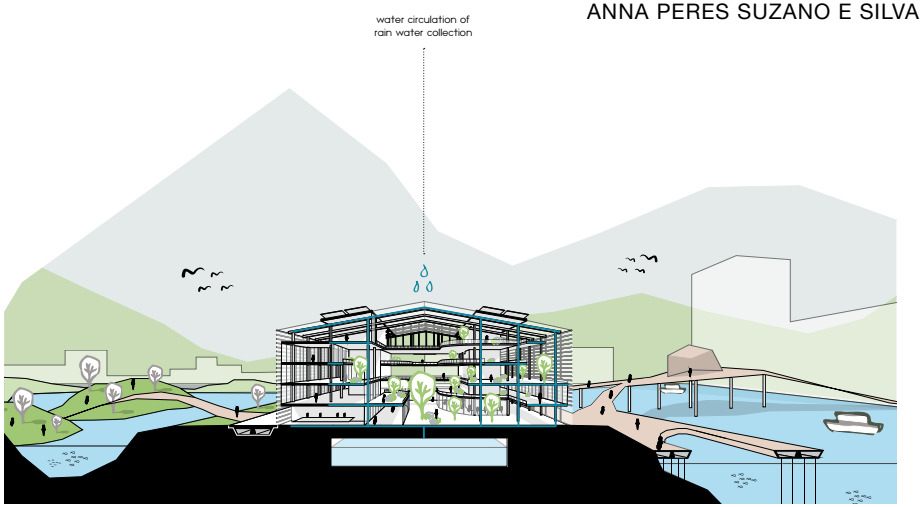
BLUE HOUSE

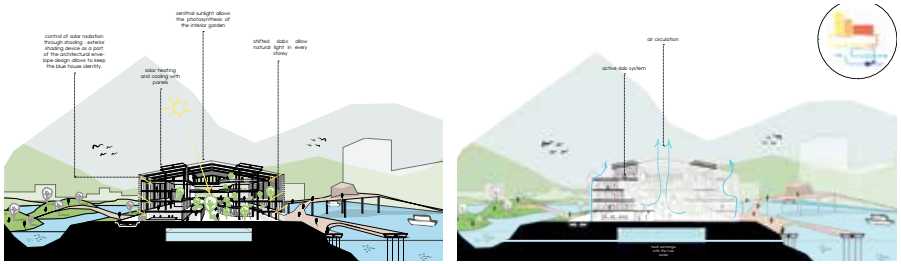
YOUSRA AARAB
SIYU FANG
KHANH LE
ANNA PERES SUZANO E SILVA

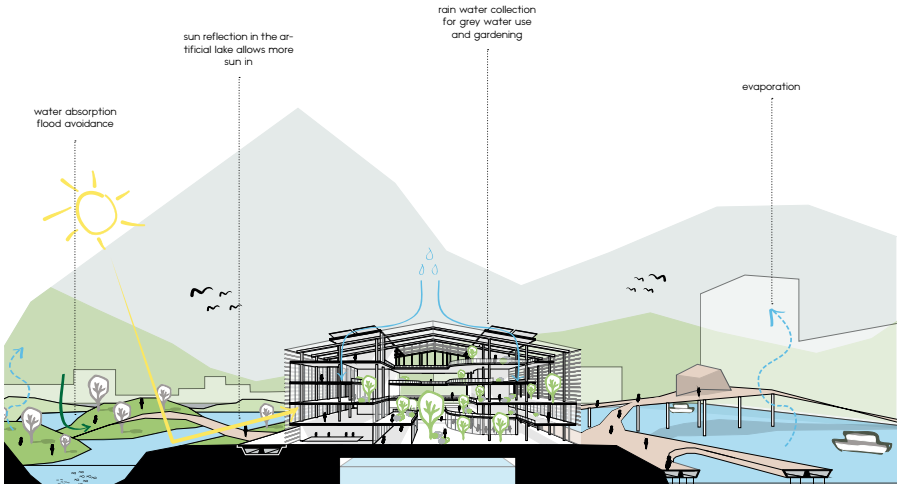






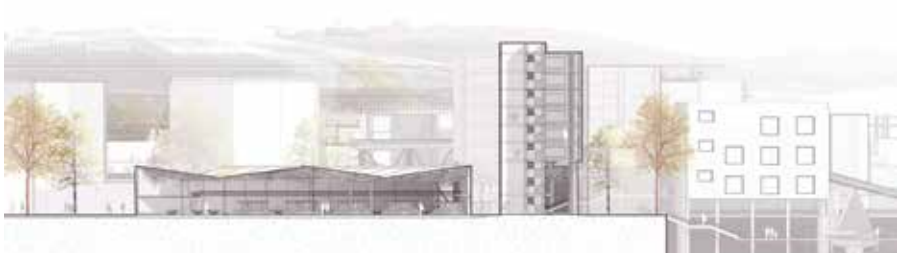


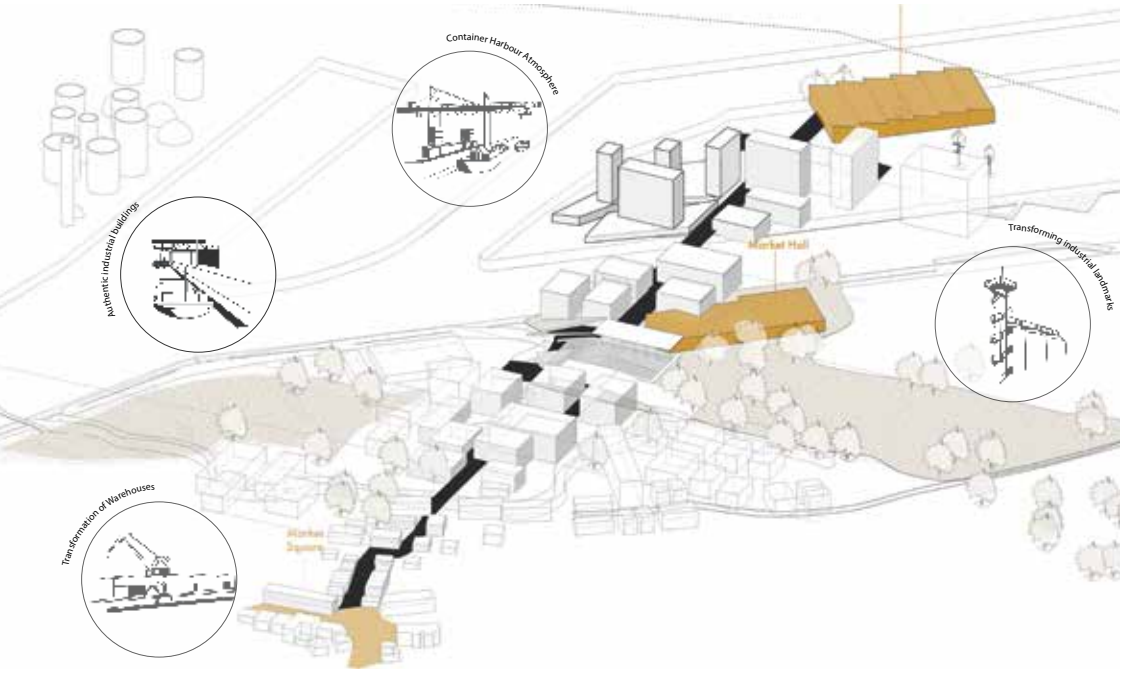


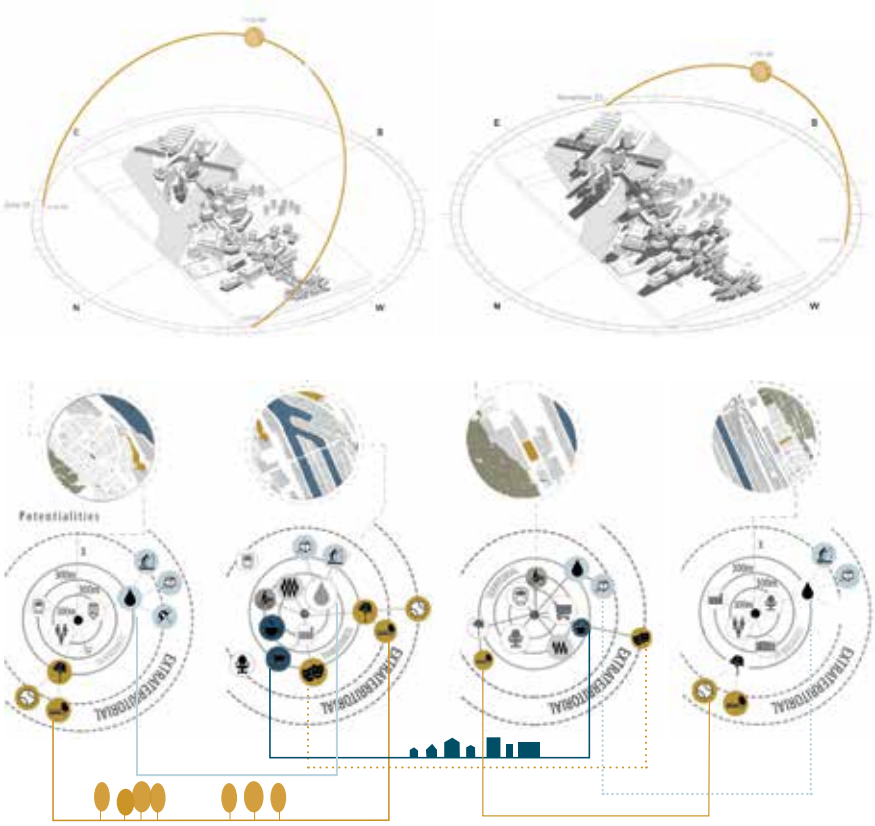


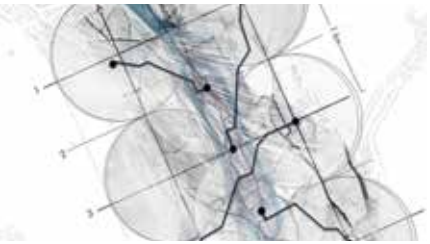
FLOWING LINKAGES

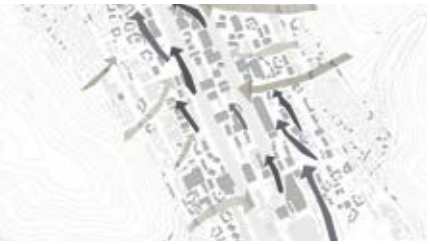
KHADIJA BENYAHYA
JULIA ULRICH
EDUARDO MOUHTAR RAFEH











4 INCREMENTALITY

[8] CEDITS : NESODEN // M. U. HENSEL

SUSTAINABILITY AND COMPLEXITY

Michael U. Hensel

In architecture, landscape architecture and urban design requirements for sustainable design are becoming increasingly demanding, complex and interdisciplinary, due to rapid environmental, economic, demographic and social changes. This implies considerable difficulties in developing a pedagogy and relevant curricula that reflect these changes. Curricula are typically modularized and need to comply with tight semester schedules, which yields the question how to address the increasing gap between growing complexity in design requirements on the one hand, and shortage of teaching time on the other. The Lampedusa Studio was set up to tackle this problem.

The interest in an isolated “island condition” concerning scarce resources led to choosing the Italian island Lampedusa as the site for the studio. Lampedusa is part of the Italian Pelagie Islands located in the Mediterranean Sea circa 200km from Sicily and circa 100km from Tunisia. The island lacks most basic resources, which need to be imported by ship from Sicily and from further afar and is a key example of resource shortage as resource and human flows are more evident and more easily quantifiable than in more connected places. Lampedusa is characterized by a desert landscape which resulted from deforestation over past centuries. Today Lampedusa is primarily known for being the port of arrival of migrants rescued from the sea. The local population of around 6000 people, experiences a lack of educational, social and healthcare services, employment opportunities. Today most of its economy is based on fishing and tourism. At the end of the 1980’s the tourism sector started growing rapidly into a seasonal inflow of 250.000 people during the summer season. The current landscape is a result of constantly decreasing agricultural activities and unregulated development that is manifested by desegregation and sprawl. In absence of a municipal urban master plan Lampedusa’s main city grew informally mainly around the natural harbor as well as outward.

In order to obtain insight into aspects influencing the social, built and natural environment, we asked the students to examine themes related to the 2030 sustainability goals clustered into three lines of inquiry:

1. Status Quo Analysis: energy, mobility, resource supply, economy, demography, infrastructure and environmental conditions including geography, vegetation, climate;
2. State of the Art solutions for waste management, freshwater production, cultivation in hot and dry environments, modulation of microclimates, renewable energy potential and further sustainable solutions related to conditions in Lampedusa;
3. Remote environment strategies for self-sufficiency and dependency with examples derived from architectural solutions in extreme environments with focus on food production and ecosystems.
Each of the research themes was analyzed across a range of spatial and time scales to understand specific trajectories of transformation, in order to define relevant design problems and to formulate a proposal for action. This fostered a self-learning process that enabled informed projective thinking toward research by design and the development of projects that originate from from detailed multi-scale and multi-domain inquiries.

The next step focused on the analysis of Lampedusa's territory. Students were asked to identify and locate different types of land-use (urban, suburban, rural, nature, water) and subsequently to selected zones between two different land-uses or with overlapping land-use for their yet to be defined projects. This implied ten zones: urban-suburban, urban-rural, urban-nature, urban-water, suburban-rural, suburban-nature, suburban-water, rural-nature, rural-water, and nature-water. The objective was to transcend preconceptions regarding the characterization and division of land-use into know patterns and related responses. This approach enabled hybrid solutions that can negotiate relevant criteria of architecture, landscape architecture and urban design.

Students worked in teams of two or three on their selected sites commencing with the outline of a brief for a project based on the preceding inquiries. This task required an ability to identify a potential project based on the progression from data to information (formulation of an inquiry) to knowledge (analysis of the inquiry and identifying potential for an intervention), and research by design.

We asked students to identify and address four related criteria in their projects:
• three relevant spatial scales: i. wider systemic context of which the selected sites are part (i.e. energy, water, etc.); ii. site scale concerning aspects that are characteristic of the site and its participation in wider systems and that can suggest that the project for the site might have a prototypical role for other similar sites; iii. differentiation of conditions in the selected sites, i.e. micro-climate, terrain, use, materiality, exposure, etc.;
• three relevant time scales: i. what is proposed for now; ii. how can what is proposed for now develop in the near future [scenarios]; iii. what is the long-term perspective of the project;
• three functional scales: i. what is proposed on a wider systemic scale; ii. what is proposed for the site in terms of scope and specificity of programs, activities and events; iii. according to which criteria is the program for the site differentiated to meet different already existing provisions and in order to inform provisions that need to arise from the proposed architectural, programmatic and environmental interventions;
• Human and nonhuman stakeholders in the systems, sites and projects.

The projects were developed in relation the scale of the entire island to utilize interactions between scales and domains. This concerned relations between objects and systems, processes and practices, and, more specifically, linked social and environmental criteria and objectives. The following short descriptions of selected projects highlights the way students responded to the challenge.

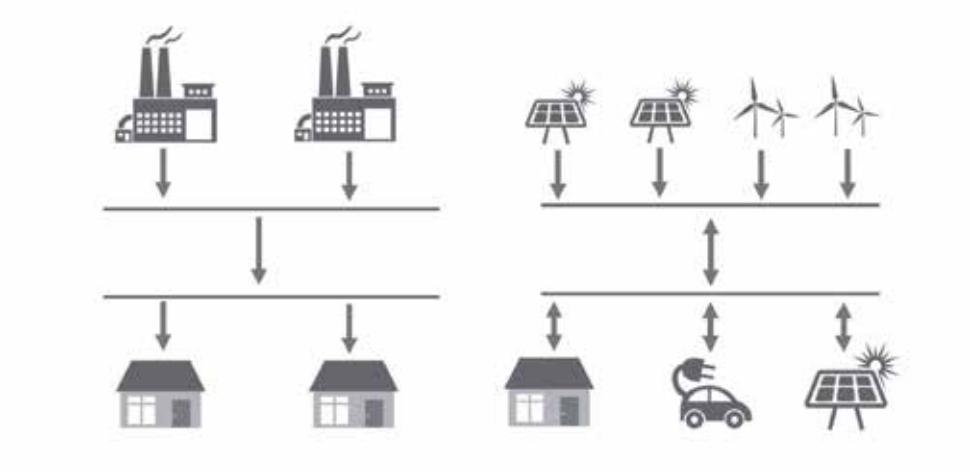
The project “Meshing up Lampedusa” focused on bioremediation through water collection at the intersection between nature and rural areas. Water scarcity is the crucial element that initiated the desertification process and limited agricultural activities on the island: ancient techniques to collect water were ignored and partially replaced by infrastructures that were not adequately maintained. The results are increasing desertification, soil erosion and decrease of agriculture. The project proposes a strategy to harvest non-rainfall water (fog and dew) through fabric-covered towers and collecting it to initiate local ecology recovery, communal gardening activities as social condensers, and environmental education. This is based on the understanding that resource management, specifically in relation to water, is a focal area for anthropologists that engage place-based community research and climate change. The project comprises different future scenarios based on the resulting amount of water for the purposes outlined by the project.

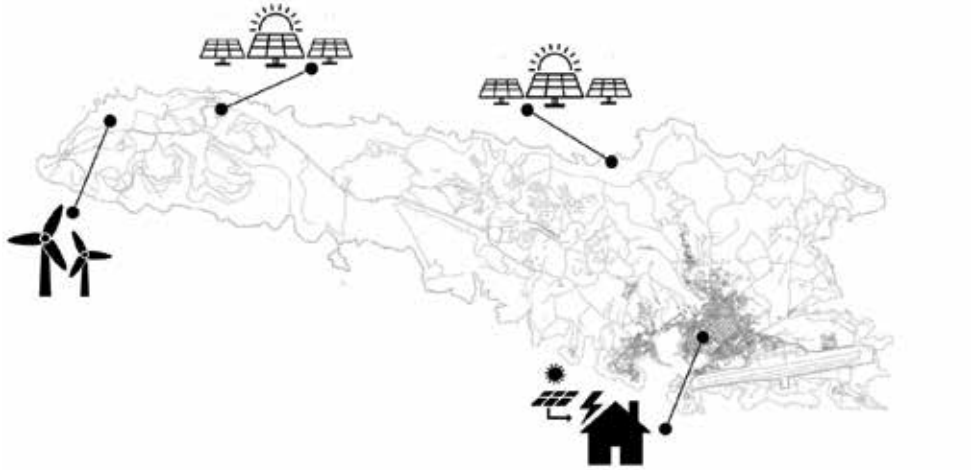
The project “Green Urban Canopy” addresses the existing relation between private backyard cultivations in the urbanized areas of the island by proposing a vision for mitigation extreme microclimatic conditions in urban spaces. As the urban area is the densest and produces large amount of waste, collecting and disposing organic waste is seen as an opportunity for creating a more self-sufficient island. Residents are to collect organic waste. The municipality contributes with brown organic waste collected from public spaces. The organic waste is used for a bio-composting process to produce soil. The produced soil is used to support green projects, as the lack of soil is one of the primary obstacles in creating green spaces in the urban context. The project proposes a block scale green canopy structure. The proliferation of covered green spaces provides shaded outdoor spaces that reduce the urban heat island effect in the dense urban environment. The canopy creates places to meet involves and fosters community activity, and limits the illegal vertical growth of the city. The columns double up as lighting system powered by solar energy and to transfer of irrigation water to the plants.

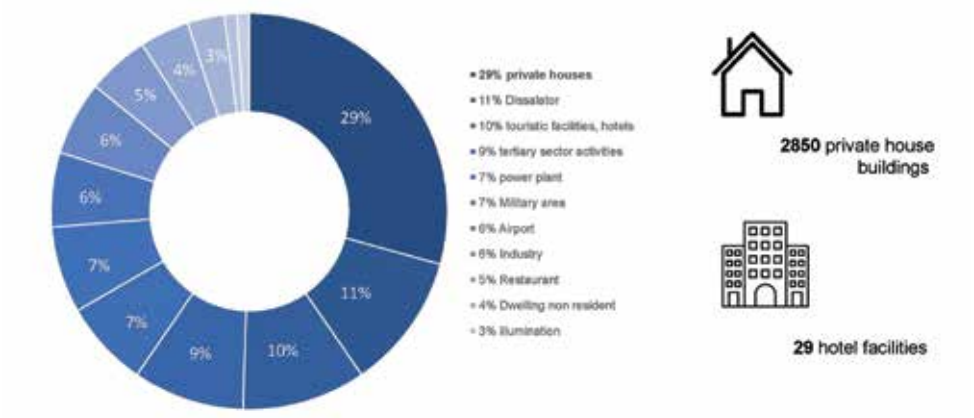
The project “M-Filter” proposed a modular architecture for waste collection for recycling as an information point, small research lab and educational information point. Initially located in the main harbor in Lampedusa the architectural elements can be relocated in part or as a whole to different sites on the island, addressing locally specific waste combinations and recycling strategies over time. The project makes specific provisions for the collection of plastic waste from the sea and on land to address the current problem of increasing plastic pollution and its impact on marine life. This part of the project was informed by interviews with researchers of the Marevivo NGO. Furthermore, the project proposed a micro-economy with workplaces for locals based on waste collection, waste related research and waste recycling.

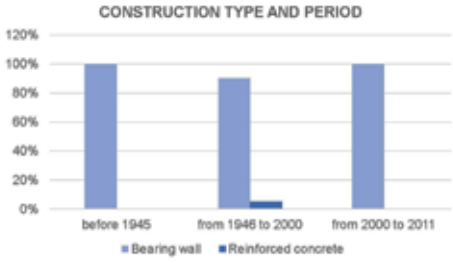
In conclusion the studio sought to combine various modes of inquiry with research by design in the search for an integrative approach to meeting complex sustainability criteria that can exceed established criteria for architectural, landscape and urban design. Local data-collection could not take place to the desired extent since the time needed exceeded the duration of the studio. In the future it might be useful to parallel the studio with correlated research activities, such as linked research studios or with PhD-level research to enable longer term development of demographic, economic and environmental development. This entails the combination of an interdisciplinary research-by-design approach with an explicit data science approach. Furthermore, it would be of interest to couple this effort with related design and built activities in which full scale prototypes could be tested. Running the studio successively over consecutive semesters could provide the framework for this.

4.1 MEDITERRANEO



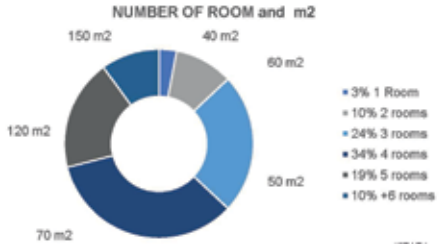




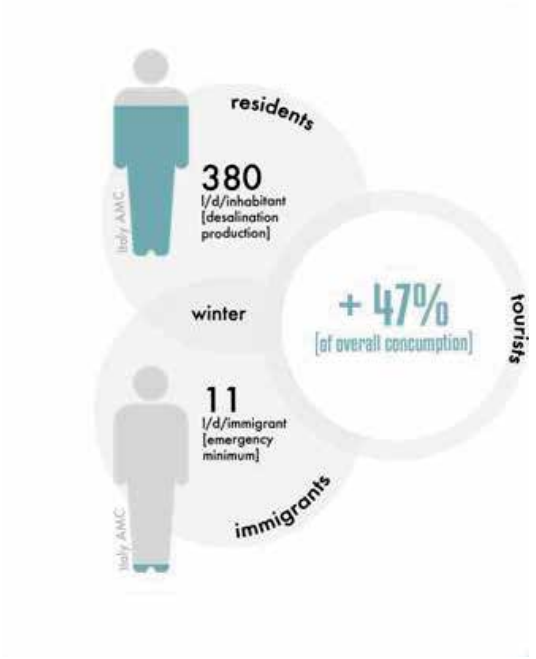


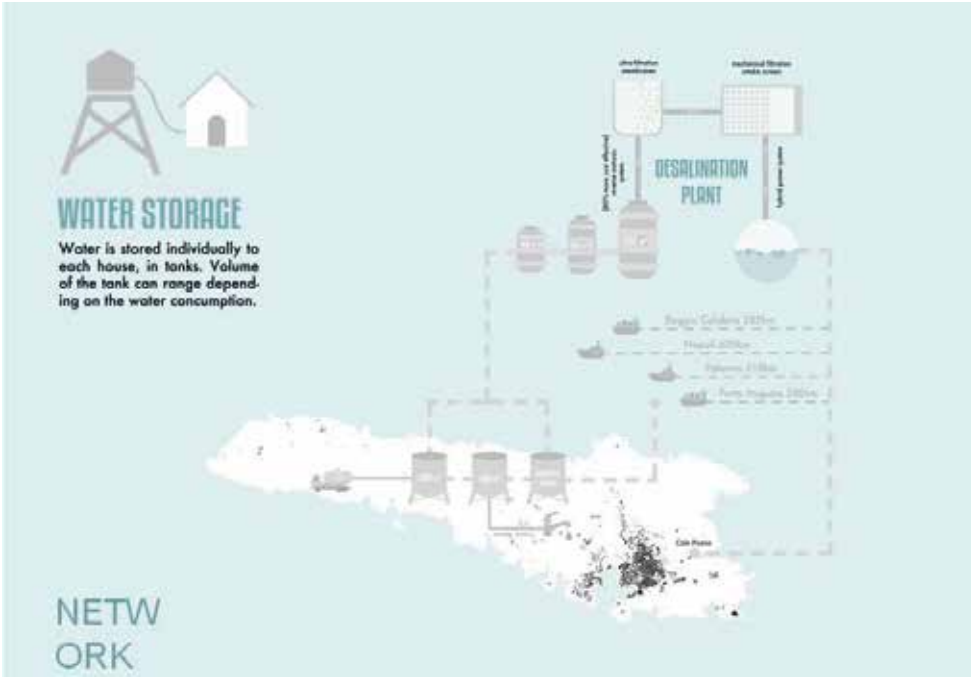
CHARACTERISTICS OF DOMESTIC UTILITIES	
SUPPLY VOLTAGE LEVEL	LOW VOLTAGE
ENERGY CLASSIFICATION	D
CLASSIFICATION OF THE ELECTRICAL SYSTEM	TT
CLASSIFICATION CEI 0-21	PASSIVE HOUSE

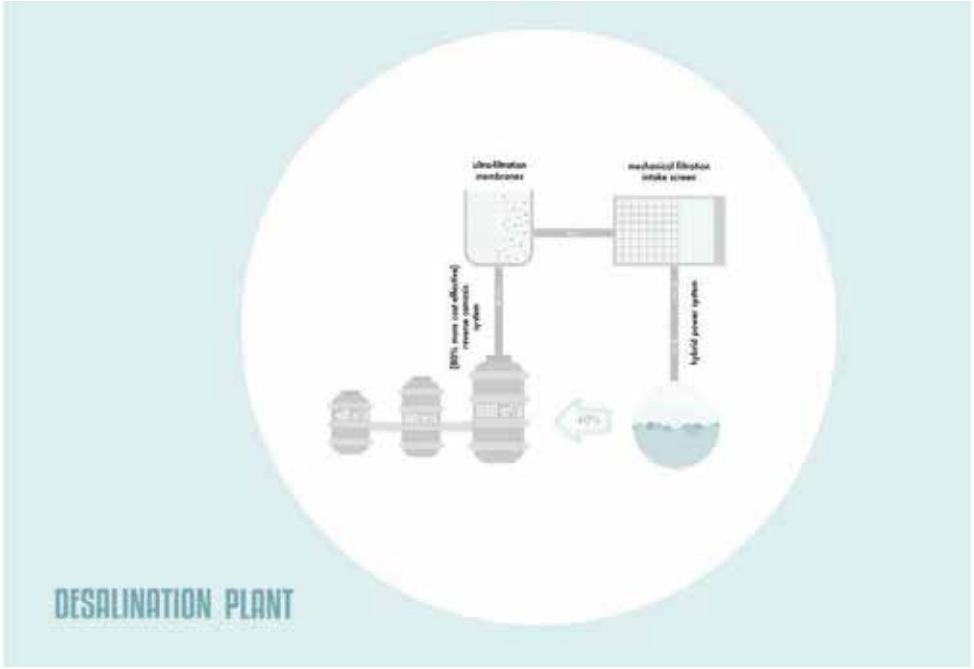
The 71% of the families are composed by 1 up to 3 members.

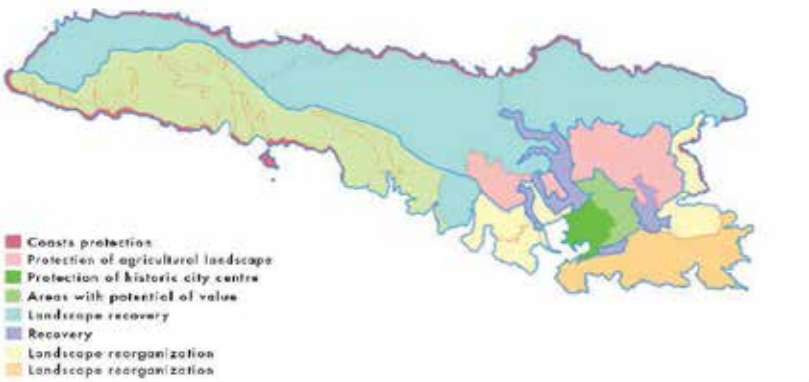


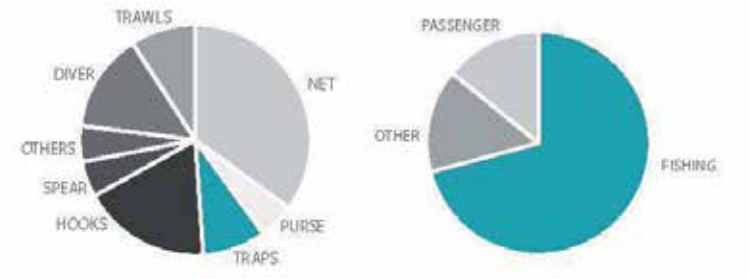

summer
winter
Lampedusa, IT
Munich, GE
rainfall canyon
Average precipitation:
Winter: 7,4 days 42mm
Summer: 0,1 days 1 mm
LOW RAINFALL

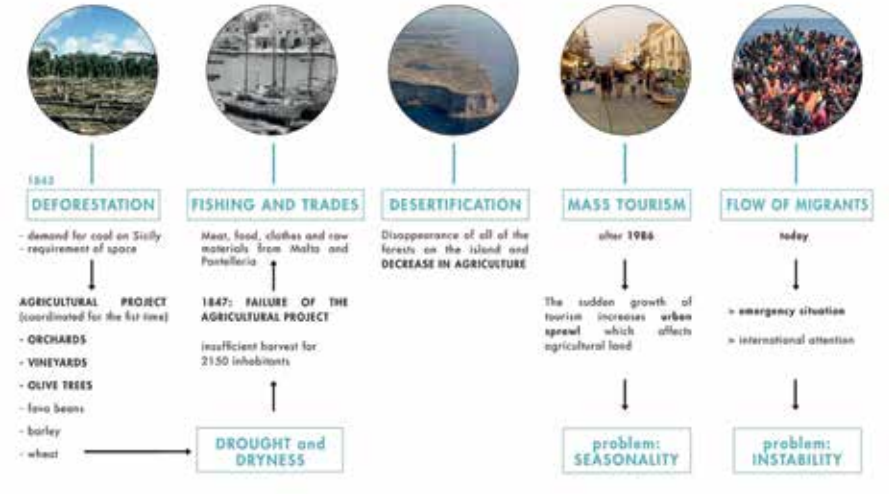

residents
380
l/d/inhabitant
[desalination
production]
winter
+ 47%
[of overall concumption]
tourists
11
l/d/immigrant
[emergency
minimum]
immigrants

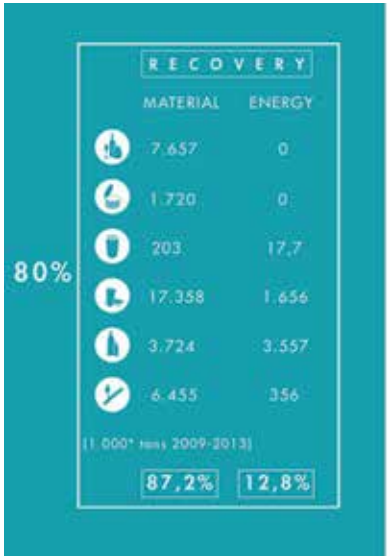

WATER STORAGE
Water is stored individually to each house, in tanks. Volume of the tank can range depending on the water concumption.
DESALINATION PLANT
NETW
ORK


DESALINATION PLANT

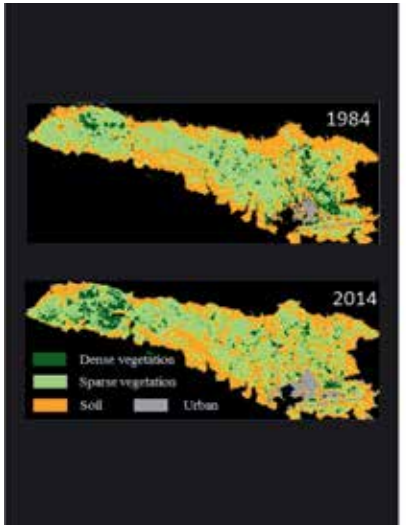

Coasts protection
Protection of agricultural landscape
Protection of historic city centre
Areas with potential of value
Landscape recovery
Recovery
Landscape reorganization
Landscape reorganization

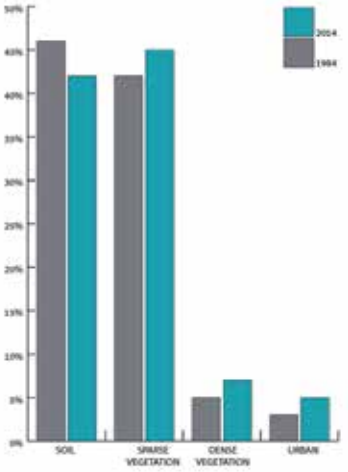

TRAWLS
DIVER
NET
OTHERS
SPEAR
HOOKS
PURSE
TRAPS
PASSENGER
OTHER
FISHING

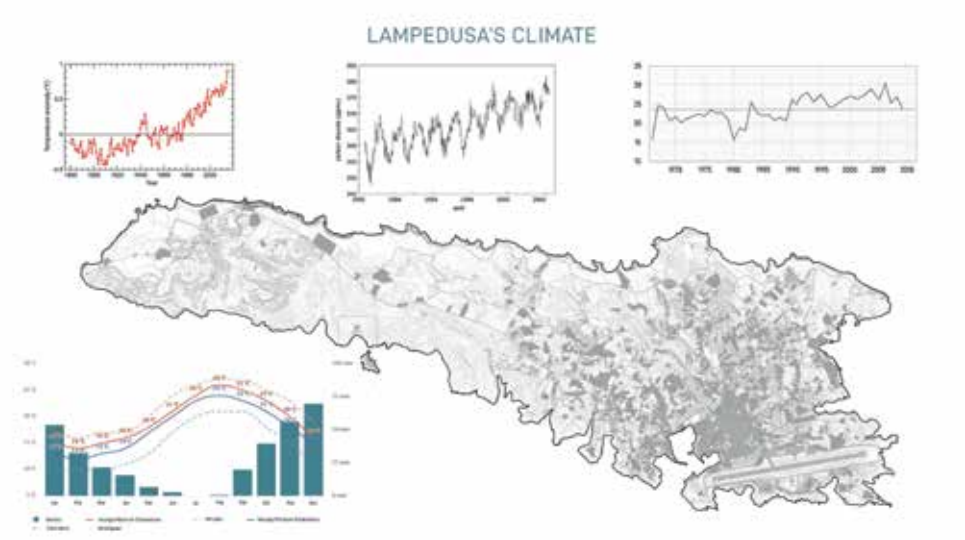

1843
DEFORESTATION
- demand for coal on Sicily
- requirement of space
AGRICULTURAL PROJECT
(coordinated for the 1st time)
- ORCHARDS
- VINEYARDS
- OLIVE TREES
- fava beans
- barley
- wheat
FISHING AND TRADES
Meat, food, clothes and raw materials from Malta and Pantelleria
1847: FAILURE OF THE AGRICULTURAL PROJECT
insufficient harvest for 2150 inhabitants
DROUGHT and DRYNESS
DESERTIFICATION
Disappearance of all of the forests on the island and DECREASE IN AGRICULTURE
MASS TOURISM
after 1986
The sudden growth of tourism increases urban sprawl which affects agricultural land
problem: SEASONALITY
FLOW OF MIGRANTS
today
> emergency situation
> international attention
problem: INSTABILITY

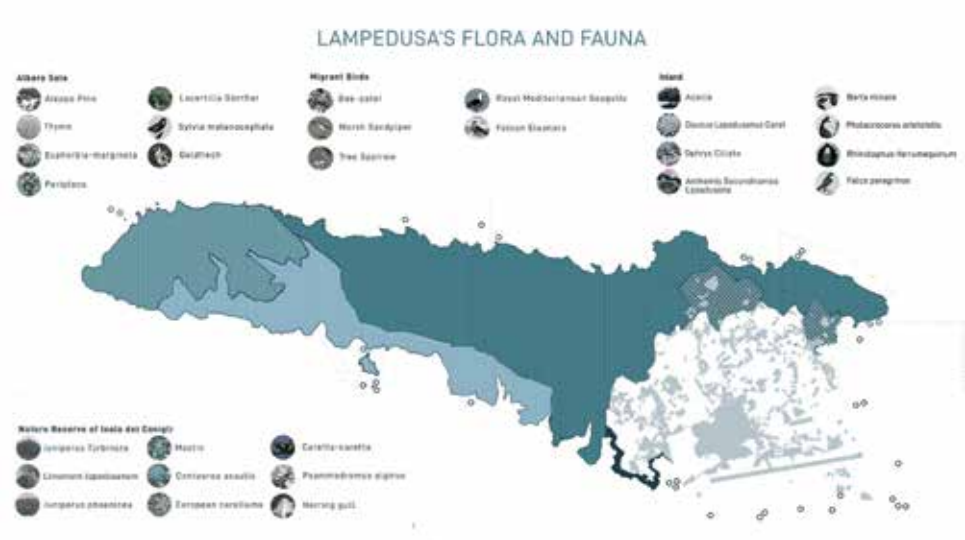

RECOVERY
MATERIAL
ENERGY
7.657
0
1.720
0
203
17,7
17.358
1.656
3.724
3.557
6.455
356
(1.000* tons 2009-2013)
87,2%
12,8%
80%

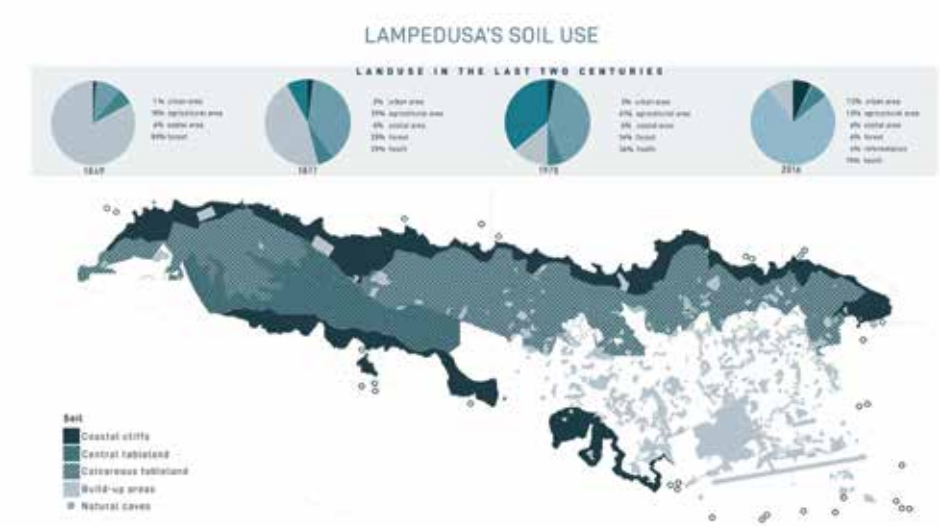

TRASH DISPOSAL
HOW DOES IT WORK IN LAMPEDUSA?
collection door to door
collection center
SICILY
Agrigento
Sciacca
RUBBISH DUMP
> biogas factory
> compost system
compost used to enrich the soil with organic matter
> ECO-CARD
accounting of quantities and calculation of waste tax discounts

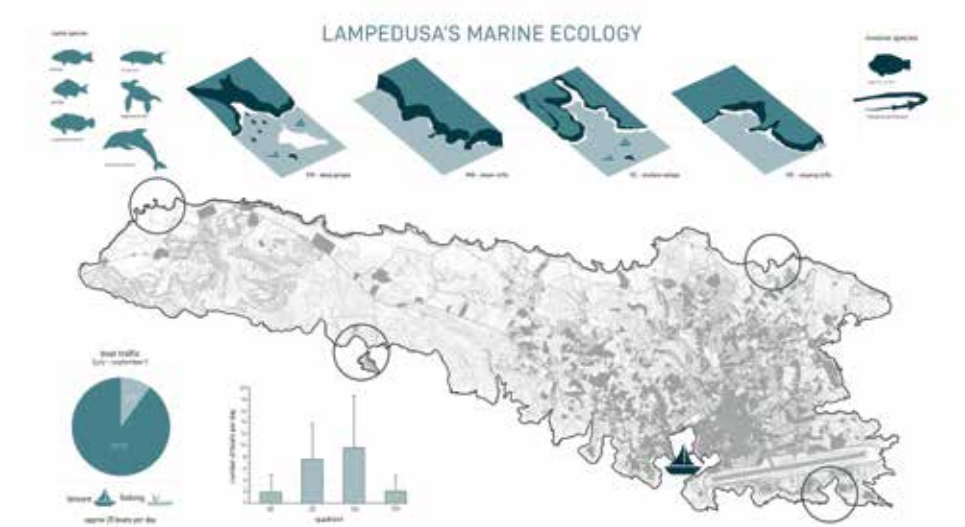

1984
2014
Dense vegetation
Sparse vegetation
Soil
Urban

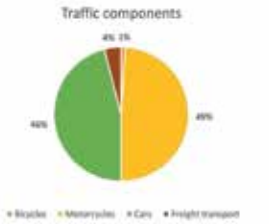

2014
1984
SOIL
SPARSE VEGETATION
DENSE VEGETATION
URBAN

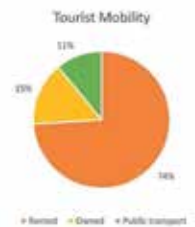

LAMPEDUSA'S CLIMATE

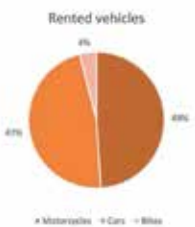

LAMPEDUSA'S FLORA AND FAUNA

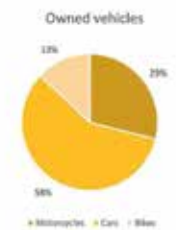

LAMPEDUSA'S SOIL USE
LANDUSE IN THE LAST TWO CENTURIES
Soil
Coastal cliffs
Central tableland
Calcareous tableland
Build-up areas
Natural caves

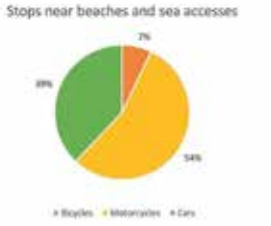

LAMPEDUSA'S MARINE ECOLOGY

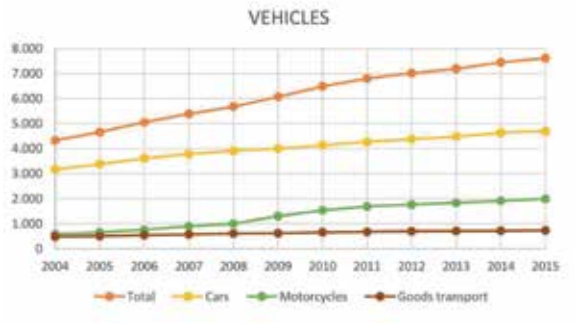

Traffic components
4%
3%
44%
49%
Bicycles
Motorcycles
Cars
Freight transport


Tourist Mobility
11%
15%
74%
Rented
Owned
Public transport

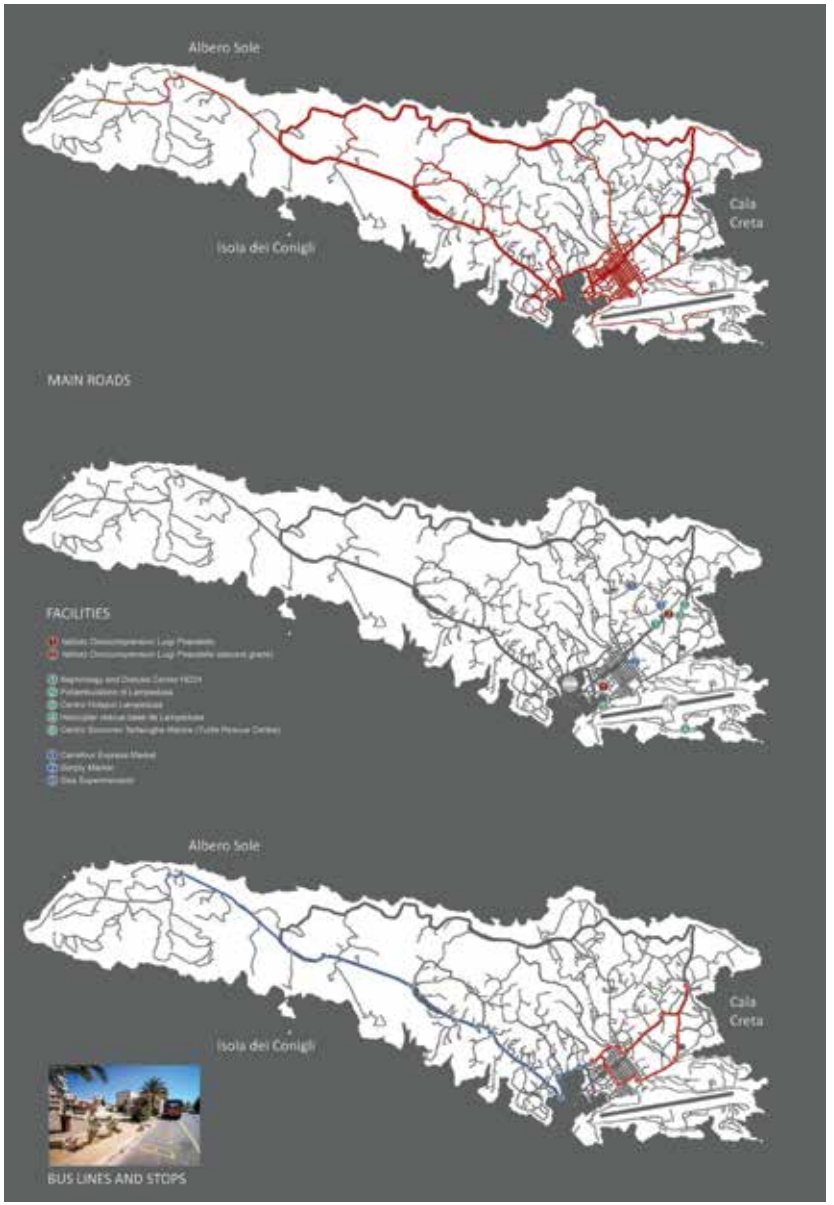

Rented vehicles
4%
47%
49%
Motorcycles
Cars
Bikes


Owned vehicles
13%
29%
58%
Motorcycles
Cars
Bikes


Stops near beaches and sea accesses
7%
39%
54%
Bicycles
Motorcycles
Cars

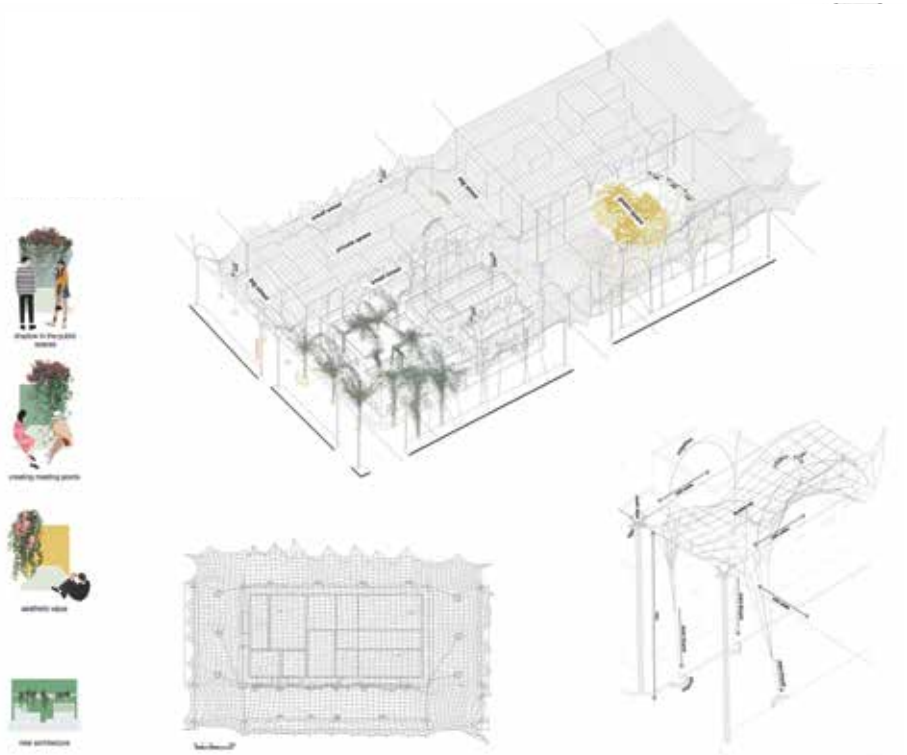

VEHICLES
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total
Cars
Motorcycles
Goods transport

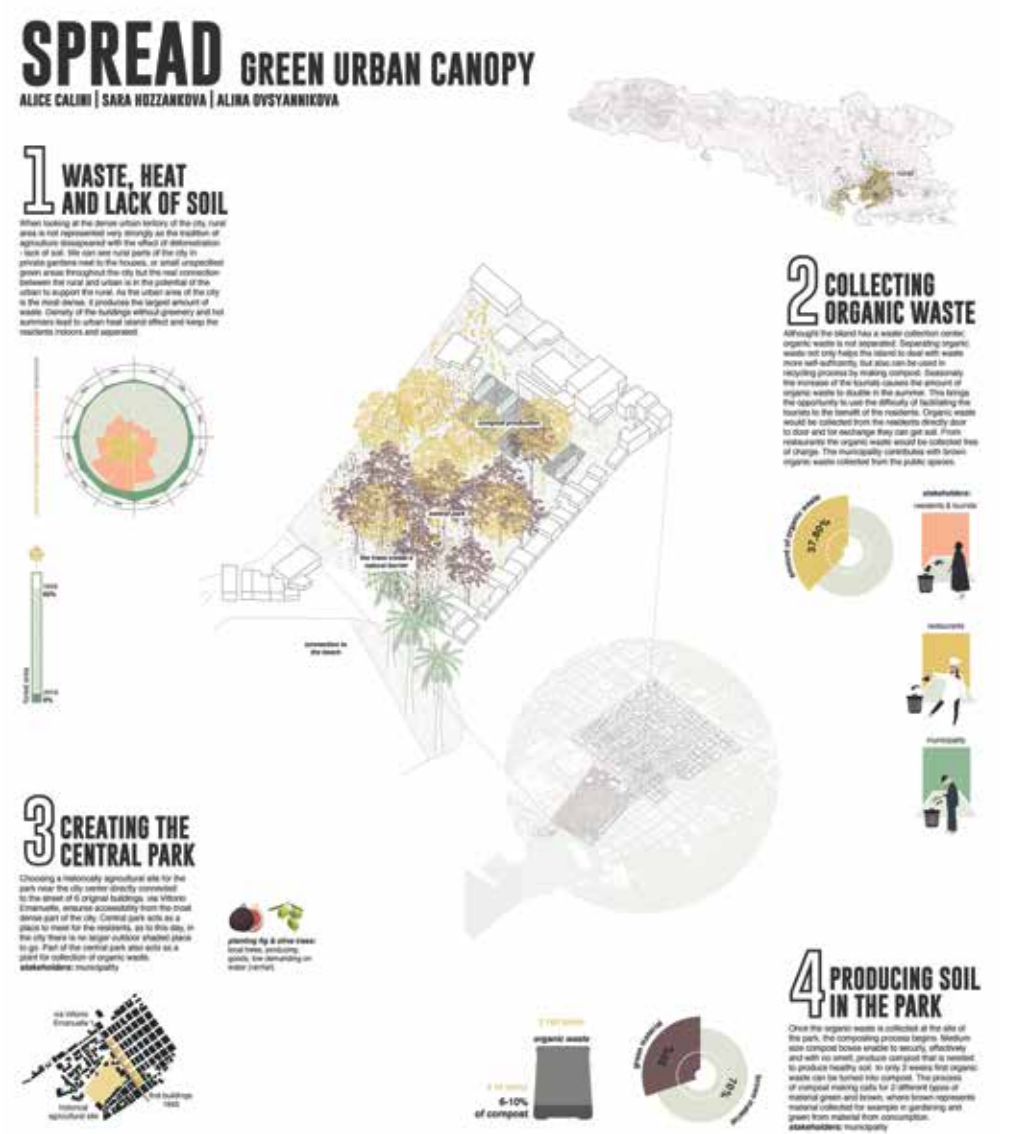

Milan
Bergamo
Turin
Verona
Venice
Parma
Bologna
Genoa
Rome
Palermo
Catania
1H
1H30


Albero Sole
Isola dei Conigli
Cala Creta
MAIN ROADS
FACILITIES
Albero Sole
Isola dei Conigli
Cala Creta
BUS LINES AND STOPS

GREEN URBAN CANOPY

ALICE CALINI
SARA HOZZANKOVA
ALINA OSYANNIKOVA





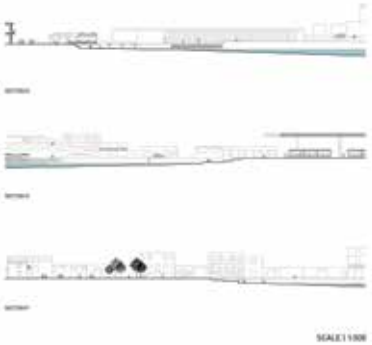

MACRO ACTIVITIES SCALE 1:1.000


FLOOD RISK AREAS SCALE 1:1.000

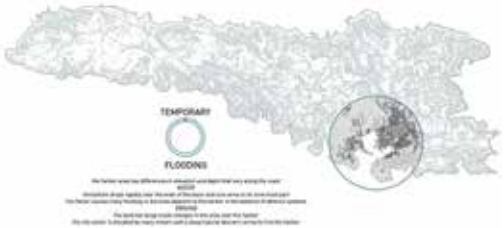

PERMANENT ACTIVITIES SCALE 1:1.000

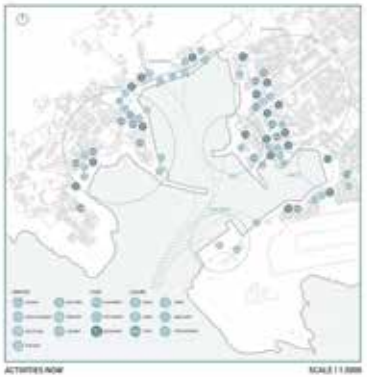

FLOOD SCENARIO SCALE 1:1.000


WINTER ACTIVITIES SCALE 1:1.000


SCALE 1:500

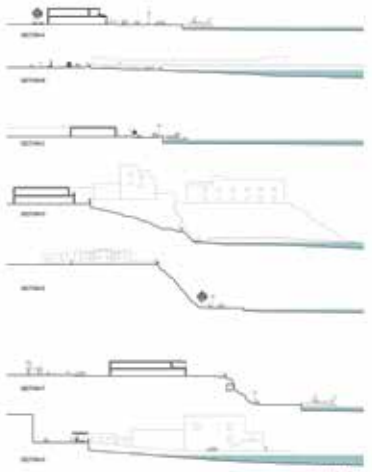

SEMI PERMANENT
SEASONALITY


TEMPORARY
FLOODING


ACTIVITIES NOW SCALE 1:1.000

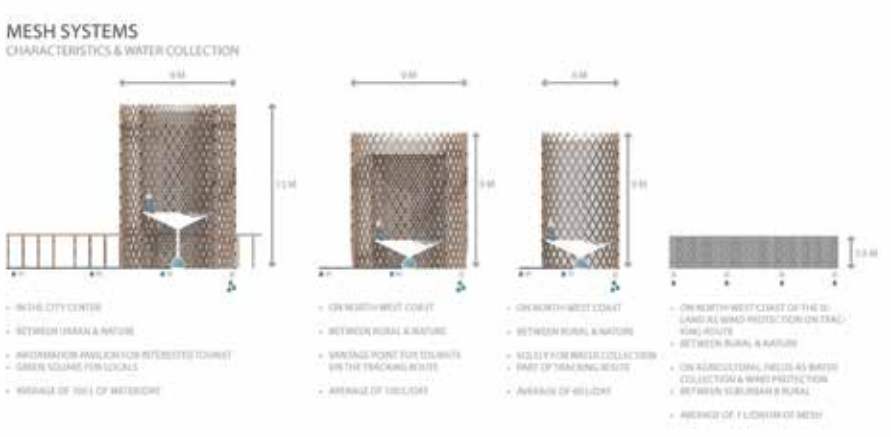

ELEVATIONS AND DEPHTS SCALE 1:1.000

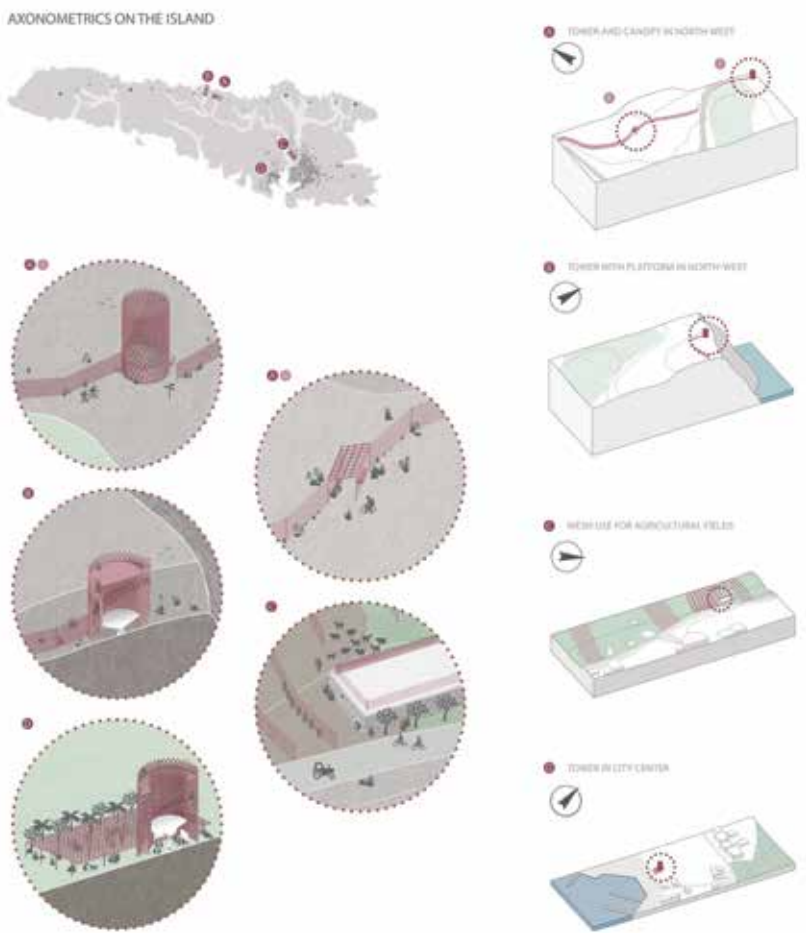

DAY AND NIGHT
FLIGHTS PASSENGERS | 2017
FLIGHTS PASSENGERS | 2006-2017

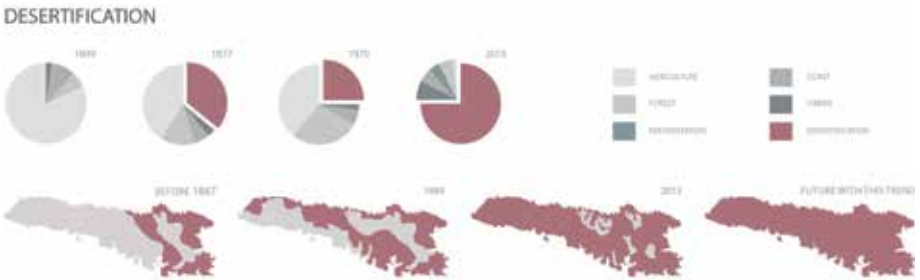

SCALE 1:500

MESHING UP

KATHARINA MEENENGA
MARIE VAN TRICHT
MATTIA ZANNONI

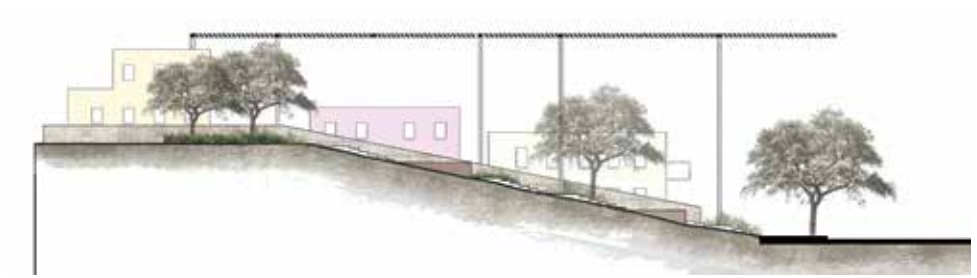


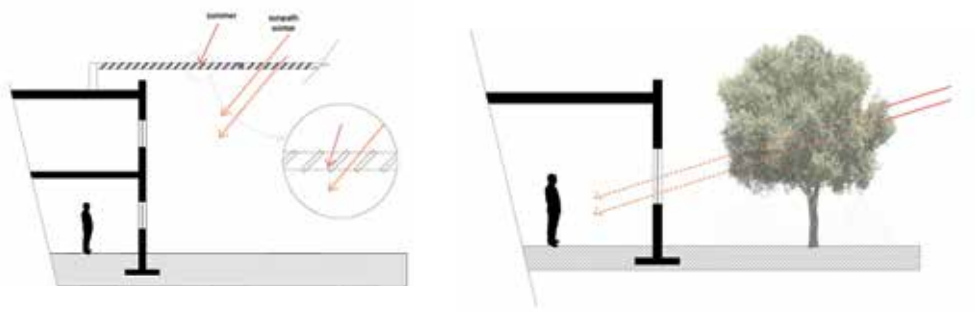




SURURBAN NATURE

NATALIE SALAMA
SIWAR EID
LIVIA MEDICI





[9] DAVID SELJE

DIVERSITY OF THE RIGID GRID

David Selje

The constant people´s movement puts an enormous pressure on cities to provide space for everyone. The topic of densification, however, seems to overcast the aim of providing pleasant environments for citizens. Abandoned areas are instantly being transformed into new quarters, old buildings vanish to become new bigger dwellings or offices and only thanks to big effort of local communities a few free spaces are protected from being developed on.

Following the pragmatic principles of time, space and cost efficiency orchestrated by the economy, the souls of our cities are slowly getting sucked dry. Role-models are standing out due to either exceptional ownership strategies (Vienna Model), new hierarchies for transport and mobility (Cycling Copenhagen) or progressive use of smart city solutions (Barcelona 22@).However, despite those few exceptions, a majority of cities rather fixes short term issues and neglects developing long term strategies that reach way further than just one legislation period.

City dwellers with all their individual, social, cultural, demographical or political pursuits and beliefs are displaying how diverse and complex its structure and behaviour is. Involving other influential factors like ecology, economics, mobility or geography, people form the focal point of our built environment. Nowhere else than in cities it is evident how complicated and challenging the built environment can get. While singular parameters, such as space, can reach their limits of growth, others such as the population rate can keep growing. Past and present discussions show that city planning is not a one-way street but rather a constant adjustments process . Even though they are sometimes more and sometimes less powerful, factors of influence are omnipresent. The city fabric must find a resilient approach of constant improvement with a clear vision but enough space for adaptation and adjustments, or as Jane Jacobs wrote in 1961:

“Cities are an immense laboratory of trial and error, failure and success, in city building and city design. This is the laboratory in which city planning should have been learning and forming and testing its theories.” [1]

How urban planning can have extreme influences on cities is exemplified by the city of Barcelona. Defined by its medieval structure, the city was surrounded by walls and therefore suitable for a limited number of citizens. During the Industrialization, the raising importance of Barcelona as a centre of trade and production led to a rapid population growth and massive social and humanitarian injustices, which forced the city into action to develop new spatial and organizational strategies. This led to the Cerda Grid and a huge expansion, which resulted in an override of surrounding villages. It was by far the most radical change in urban planning in the city’s history and the beginning of a success story in urban design. Until today, the octagonal block is part of the city’s identity and primary element.

The Studio “BCN Super Block” focuses on one specific district of the city, which once was a village on the edge of Barcelona. The district of Poblenou, that predominantly has been an industrial area and the driver or Barcelona’s economic power for a long time, turned from heavy industry into a living district of the city due to the decrease of production and the constant search for living habitat [2]. The controversial clash of those very different uses led to a great transformation process with a constant change.

This outstanding aim is manifested by the 22@ development strategy, which brings in all kinds of stakeholders to shape and fill the aims with research and innovation [3]. Despite others, it inhabits the concept of the “Super Block”, a cluster of blocks with a new distribution of public space. This greater differentiation of the block structure aims to find solutions for reduced neighbourhood traffic and a higher access to public space. Lower driving speed within the cluster is only one factor that creates an additional filter to differentiate the inside from the outside even though the block sizes or street depth remains identical.

Adjusting and developing new concepts within a set framework structure led by social, spatial, health or transportation demands, formed the starting point for the design studio in Barcelona. While other parts of the city reached its saturation in terms of social and built density, the district of Poblenou is still under redevelopment and offers various opportunities for transformation processes. The existing fabric with small workshops, research institutions, empty plots, huge vacant factories, multi-level housing units and big office complexes creates an interesting mix and a vivid atmosphere. Despite following the rules of the grid, the height distribution and the usage of the blocks´courtyards seems to outrun the possible and creates a completely different atmosphere than in other districts in Barcelona.

With the aim to investigate existing structures and current developments, the students studied the current setting, engaged with its history, and tried to identify further threats and challenges alongside the current transformation processes. With a conceptual, sometimes radical approach, they further proposed alternative design concepts to display additional opportunities and/or provocative possibilities; all with the aim of increasing the quality of the urban space and the built environment.

Within the complex network of multiple parameters, the investigation and research were grounded in a study trip to Barcelona. There, the students experienced the atmosphere and the genius loci through city walks and engaged with the IAAC research institute and with local architecture firms to better understand the circumstances, drivers and opportunities of such change. The complex and widely spread actions taken on multiple scales, show how advanced the city is in terms of applied research and the conscious urban planning in the digital era. We discussed, how Barcelona uses data mining and evaluation to increase the efficiency of its network. The municipality´s progressive

approach to promote the use digital tools to support qualitative design parameters with quantified information, is remarkable [4]. The research teams and the city council are taking action to use the city as a test field to learn how to proceed with building future cities, even though the advantages and impacts it can have on topics like urban micro-climate or mobility are still under development.

Based on this fruitful information, the design projects dealt with all kinds of different focuses. They all considered not only a single element to become a changing force but a network of multiples. The City of Barcelona was a great way to investigate the state-of-the-art strategies of constantly adjusting and shaping our future living spaces in highly densified urban areas.

[1] Jacobs, Jane. (1961) The death and life of great American cities. New York : Vintage Books

[2] Checa-Artasu, M. (2000). Poblenou i la reconversió de les fabriques (Poblenou and the reconversion of the factories). Icària. Papers From the Historic Archive of Poblenou, No. 4.

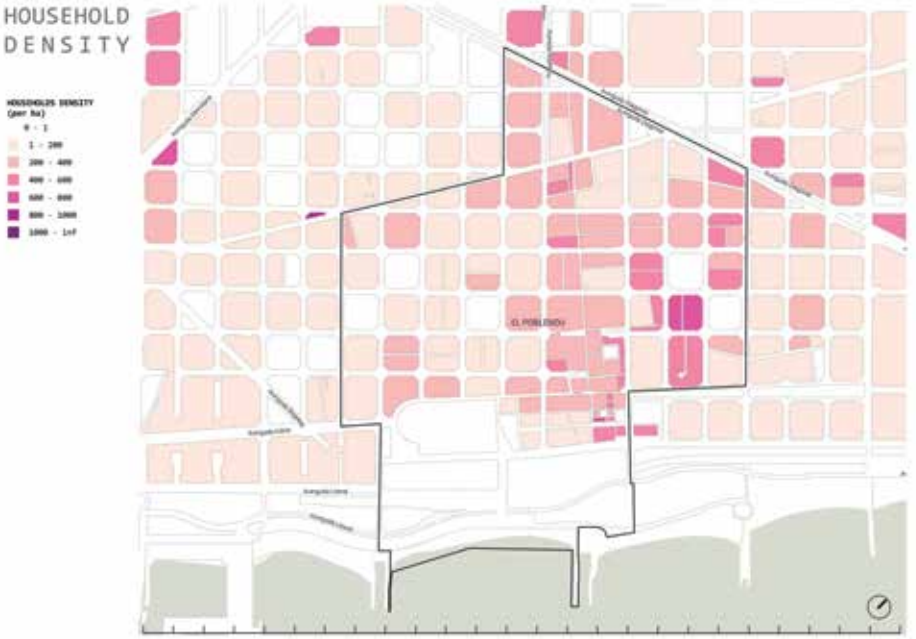
[3] Garcia, Lidia; Rodriguez-Castellanos, Arturo; Barrutia-Guenaga, Jon (2013). Proceedings of the 5th European Conference on Intellectual Capital: ECIC 2013. Academic Conferences Limited.

[4] Official website of Barcelona City Council. https://pladebarris.barcelona/es (Accessed on November 7, 2019)

4.2 BCN - SUPER BLOCK

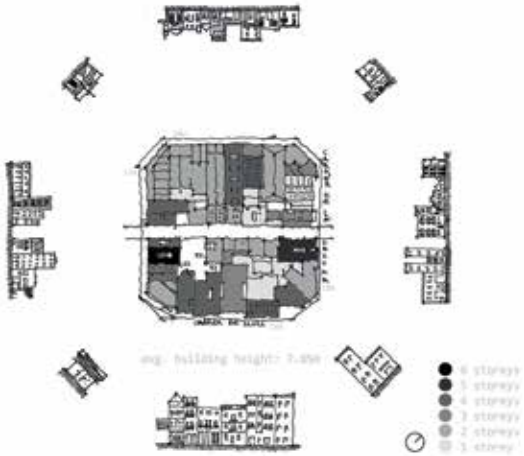
DENSIFICATION

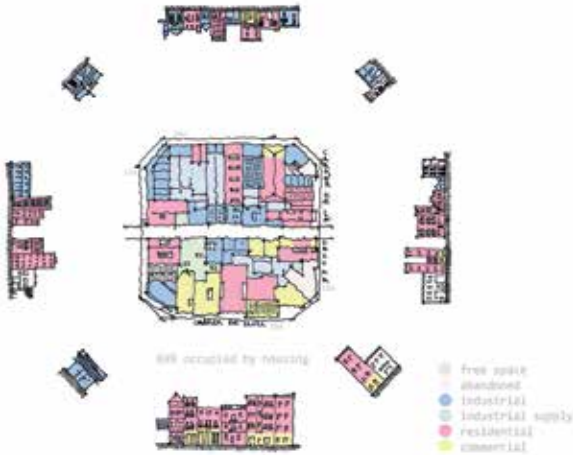
CONTEXT



UTILIZATION

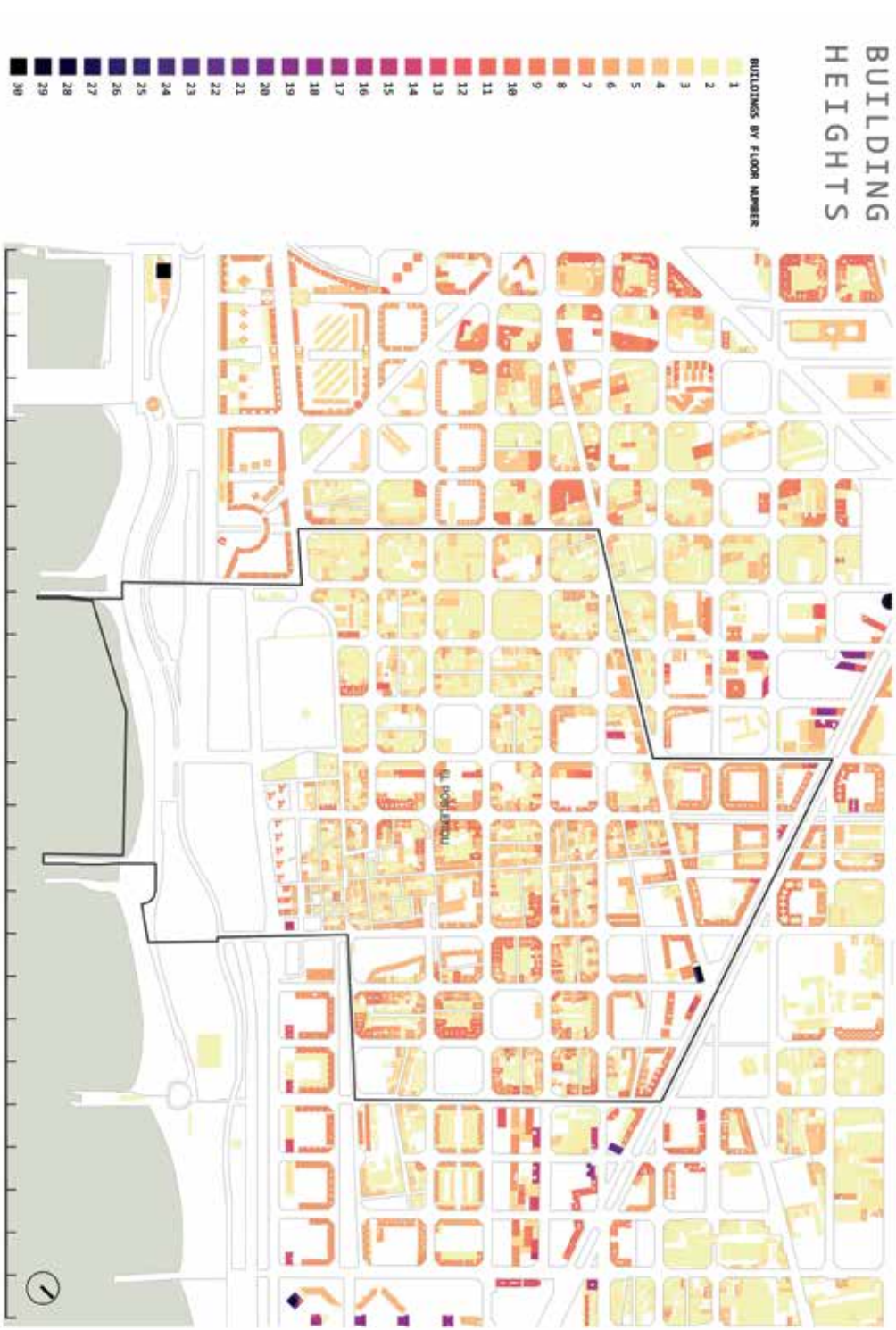
CONTEXT





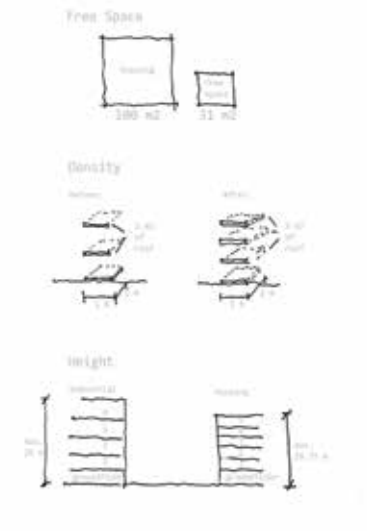
BUILDING HEIGHTS

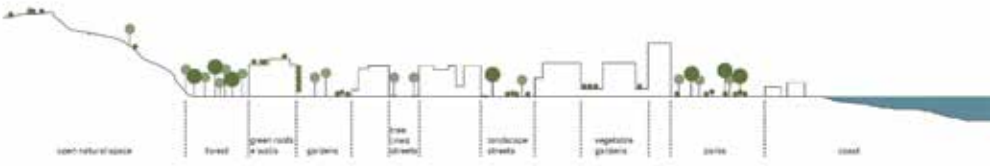
BUILDINGS BY FLOOR NUMBER



CLIMATE ANALYSIS

CONTEXT

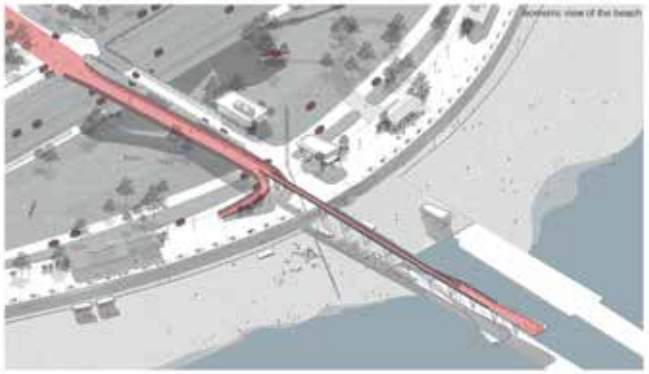


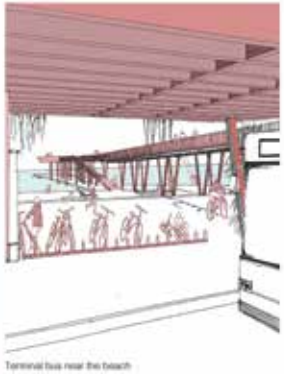


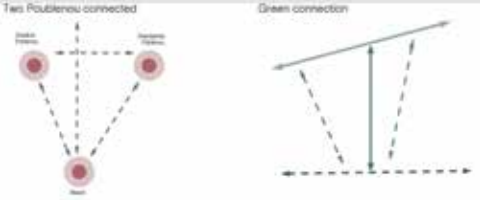

RBLA
FUNDACIÓ
VILA CASAS

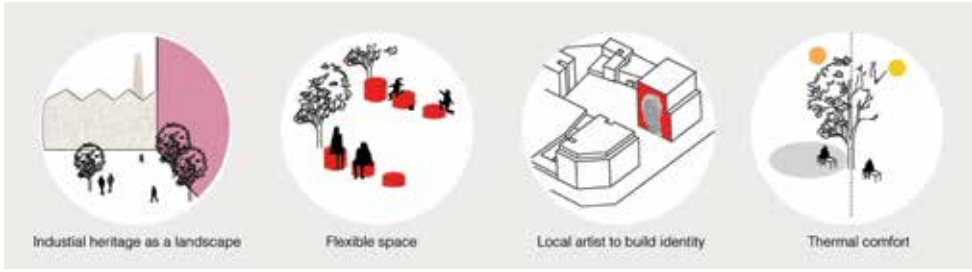
BACKBONE

SYMON TOBIAS GUANTERO
ALESSANDRO PEDRAZZOLI
LUCREZIA RODRIGUEZ
CHIARA SACCOMANNO



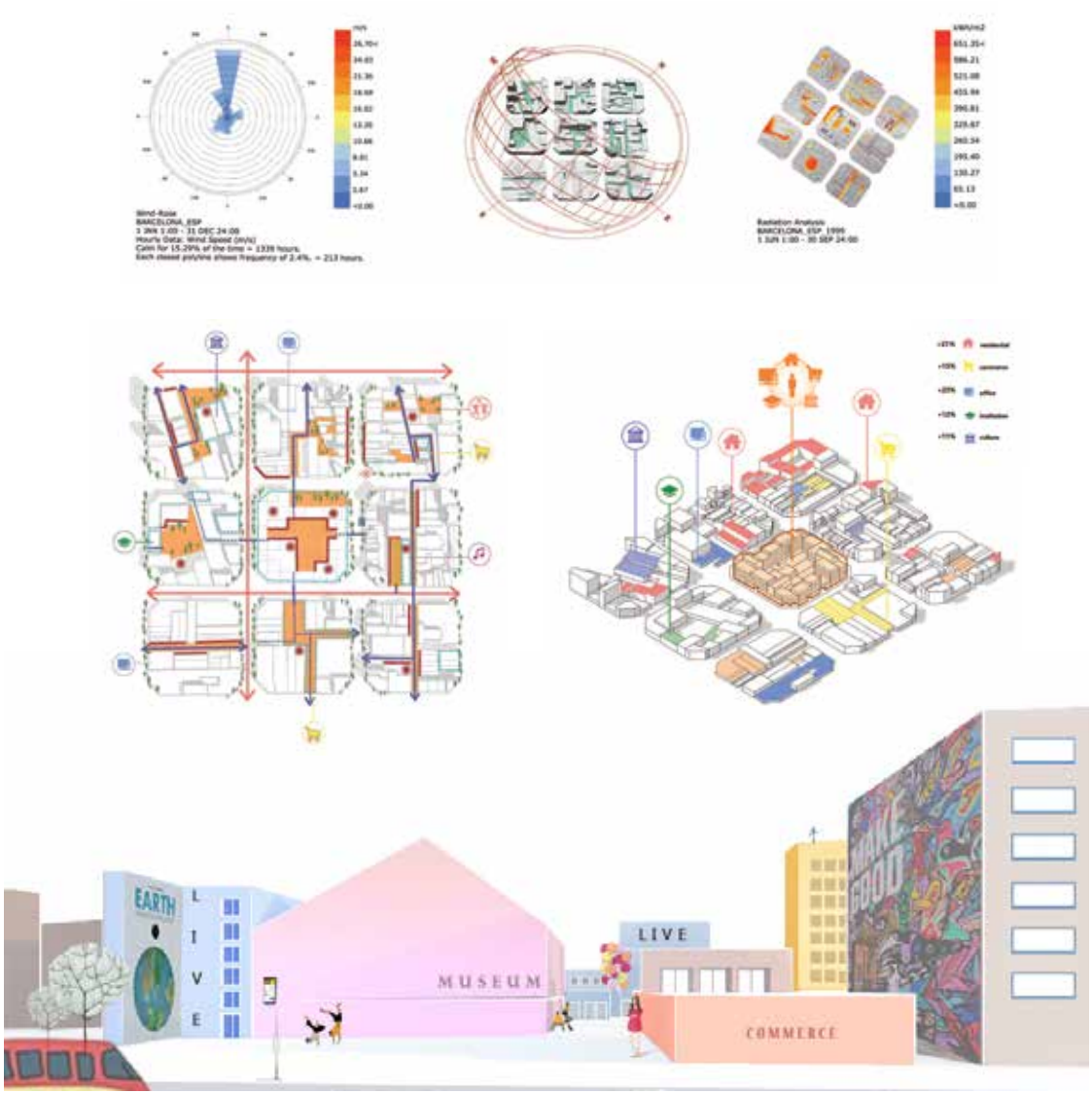


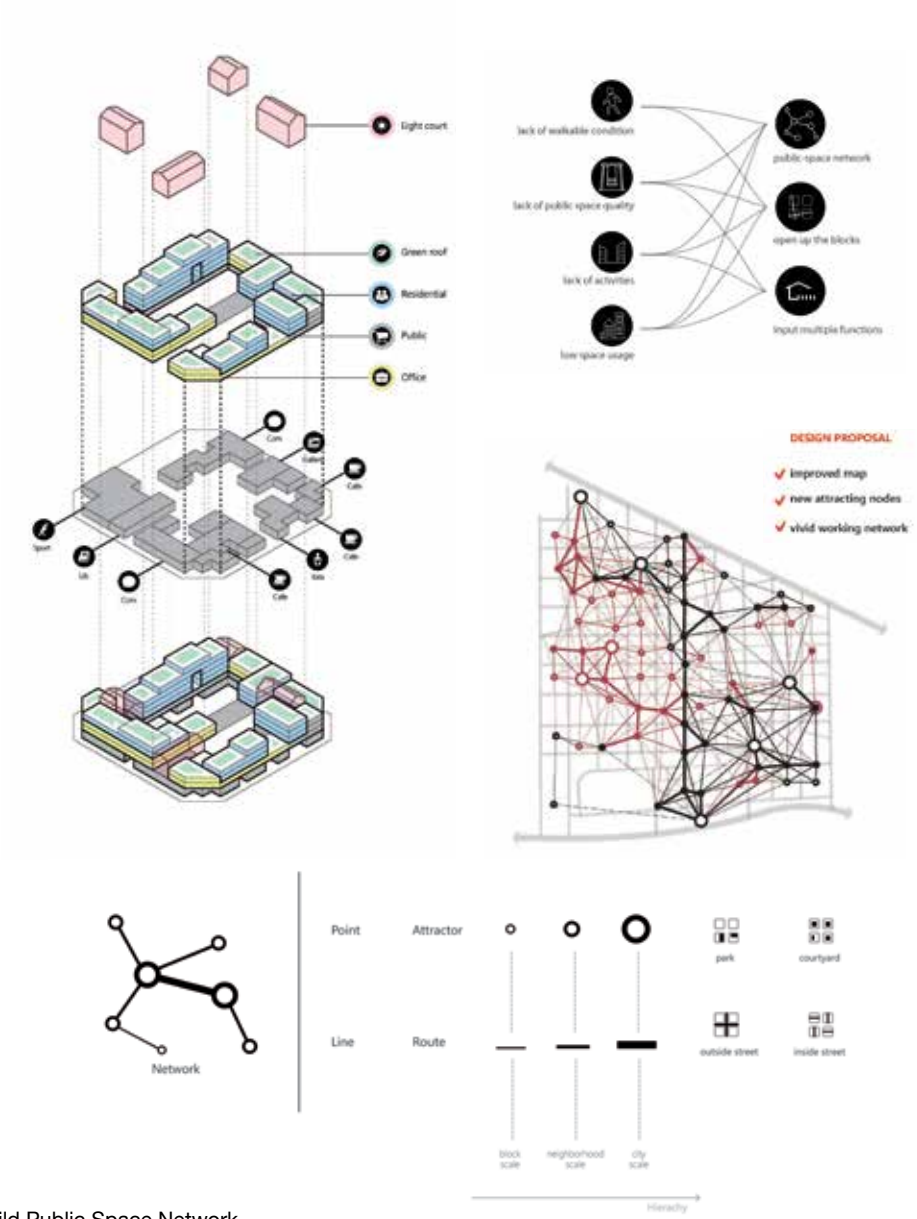




PUBLIC NETWORK

ALEXANDRA BAYBORODOVA
SHILIN PENG
MUSLIMA RAFIKOVA





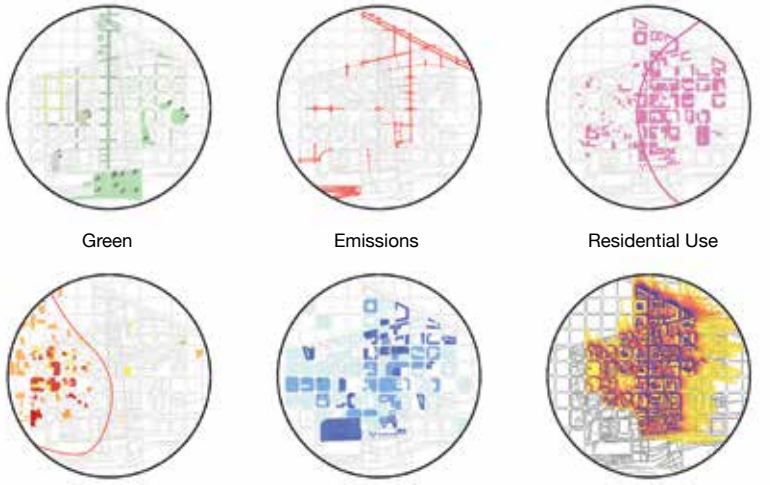
Build Public Space Network

TAPE

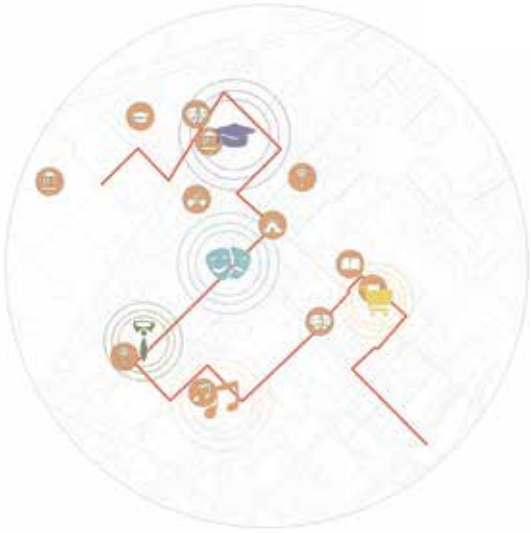
ALEXANDRA BAYBORODOVA
SHILIN PENG
MUSLIMA RAFIKOVA

Education Area

Amusement Area



Green
Emissions
Residential Use
Industrial Use
Using the City
Climate



„ Line City “

Locate + Identify
Open + Empower
Connect + Densify

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Stefan Behnisch has been an advocate of sustainable design since he started working as an architect. He is the founding partner of Behnisch Architekten in Stuttgart, with branch offices in Los Angeles, Boston and Munich. His first building abroad, the Institute for Forestry and Nature Research in Wageningen, NL, became a milestone for innovative sustainable solutions. His goal - to connect the forces of human life and the natural environment – fuels the design of every commission his firm receives. His innovative approach to sustainable architecture is highly acknowledged in Europe, North America and all over the World, and his buildings have been honored by prestigious institutions and industry organizations alike.

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Alessandro Melis is professor of Architecture Innovation at the University of Portsmouth and the Director of the International Cluster for Sustainable Cities, a cross-faculty research group. His specialist teaching, supervisory and research interests are in the fields of climate sensitive design, sustainable strategies for urban mutations, environmental policies, radical theories and criticism. Previously, at the University of Auckland, he was the head of the technology area and the director of the Postgraduate engagement (school of Architecture and Planning). He has been recently appointed as curator of the Italian Pavilion at the next Venice Architecture Biennale (2020). His books and articles have been widely published in Europe, New Zealand and USA. With Gian Luigi Melis, he founded (1999) Heliopolis 21, an architecture and urban design practice based in Italy, Germany, and UK.

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