Resource Efficient Urban Regeneration Of Informal Settlements In Tirana, Albania

Solutions For On-Going *Transformation*

IMPRESSUM

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Figure 1: Tirana informal settlement birdview - 1

Acknowledgement

by Sardar Sher Muhammad Khan

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Foreword

by Sardar Sher Muhammad Khan

The REAP (Resource Efficiency in Architecture and Planning) Master's Program is a multidisciplinary and international program at HafenCity University, Hamburg, that brings together professionals from all over the world. The program's focus is on sustainable planning at various scales and in different cultural, geographical, and societal contexts. By following an integrative and multidimensional approach to real-world applications, the REAP program offers students opportunities to approach the challenges of today with realistic recommendations and solutions supported by the faculty with an extensive background in the field of sustainability at both the technical and political level. The program consists of three core projects at different scales: the city, the neighborhood, and the building. This brochure highlights the works of the 12th generation REAP students' third project, in the context of Resource Efficient Planning in informal settlements of Tirana, Albania. The projects and essays on the following pages aim to give the reader an understanding of the challenges and opportunities affecting the post-socialist urban transformation in the city as well as the consequent innovative, contextually appropriate, and climate-responsive planning strategies developed to support the resource efficient urban regeneration of informal settlements in Tirana, Albania.

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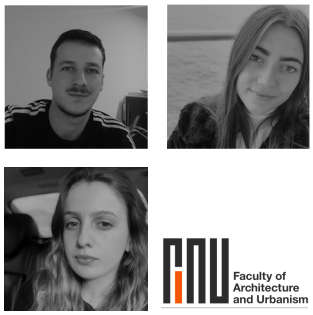

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01 Introduction

Introduction to REAP by Sanjana Mahesh Adi

The HafenCity University (HCU) in Hamburg offers an interdisciplinary Master's program; Resource Efficiency in Architecture and Planning (REAP). The program enables students to consider sustainable development strategies on various scales in different geographical and cultural settings through an integrative and multidimensional planning approach (HCU, n.d.).

Project III is one of the modules of the master's program offered in the third semester. This is a collaborative project between the REAP Faculty at the HafenCity University and the Department of Architecture at the Polytechnic University of Tirana. During the coursework, students work in close cooperation with one another — exploring the area developed informally along the Lana river in Albania. To understand the varying urban housing contexts, the Steilshoop social housing quarter in Hamburg was visited as a case study during the 2nd of two workshop weeks. This provided first impressions and opening discussions for the varying urban, institutional, environmental, social, and cultural contexts within which each housing solution was built and now operates. This cross-border analysis provided an interesting comparison of each site and housing solution with their unique challenges and opportunities, which further guided the analysis and concept development for the duration of the semester.

Due to the restrictions of the COVID-19 pandemic, this joint project took place partially through digital workshops. The first workshop week took place entirely online, whereas for the second workshop week, the Tirana students traveled to Hamburg, where the 2nd workshop was conducted at the HCU. These workshops consisted of site visits, expert presentations, and case studies which helped in exchange of information on the effects of post socialism, development of informal settlements, and the project site. To conclude the workshops, virtual exhibitions in the form of poster presentation were presented by the students.

"Exploring the area developed informally along the Lana river in Albania."

As the REAP students could not visit Tirana, each Hamburg group partnered with a Tirana group to help in gaining clearer insights to the project site with the help of pictures, videos, and interviews of people living in the neighborhood. This provided a deeper insight into the local situation and access to required data to enable an in-depth understanding of the situation and site, which helped in progressing through the proposal development. Each of the REAP groups focused on interventions related to one of the five REAP scopes of: energy; waste and materials; water; mobility; and sustainable urbanism. After the workshops, students continued working on their individual group research proposals for the Astir neighborhood in Tirana throughout the semester.

This brochure highlights the processes and summaries of each group proposal, which has been derived from a comprehensive analysis and expert consultations to achieve resource efficient solutions for the informal settlement in Tirana.

Figure 2: Tirana informal settlement birdview - 2

Introduction to FAU by Igli Shehi

Tirana is the capital and the largest city of Albania. It is a briskly changing city full of anomalies. All its chaotic urban texture reflects its extraordinary history. After having experienced one of the harshest authoritarian regimes of the Cold War period, Albania entered a radical process of change in the 1990s. Consequently, Tirana has experienced rapid population growth that has caused a lot of problems. The fall of the communist system in the 1990s and the establishment of a pluralist-democratic system were accompanied by many social, economic, and physical changes. The centrally controlled system was replaced by a liberal economy and unplanned development. In terms of construction, this brought the development of informal private housing on the outskirts of the city, which were spreaded by occupying agricultural fields. The land, which was previously entirely in-state status, underwent the process of return, compensation, and privatization. The property situation is complicated by the lack of legal documentation. The consequences of this change are seen in the construction of housing in the study area. The study area is located in the northern part of unit number 7 of Tirana, in the absence of infrastructure and public transport access inside it. The study area has undergone a timely transformation due to changes in governments but also migratory movements. This has led to the alienation of areas, where from a space used for agricultural land and greenhouses took another form after the occupation by people coming from other districts of the country. The lands were occupied without any criteria and construction became informal. Construction without criteria has often led to the demolition of the buildings due to the development of the new infrastructure. According to the actual General Local Plan, the area is known for housing and services in 94% of it, while 3% belong to infrastructure and 3% to education. Objects in the area can go up to 9 floors and 29m high. The intensity of construction is 3% and the coefficient of land use is 45%. The existing condition of the area consists of the presence of roads without infrastructural standards, irregular distribution of informal dwellings, pollution on the surface along

"The lands were occupied without any ownership criteria and construction became informal."

the river, as well as the risk that Lana river faces for getting overflowed onto the surrounding banks, shores and neighboring land. The dissatisfaction of the residents is really disturbing, due to the poor conditions offered by the area. One of the other environmental threats of the site is the pollution of this river, since it serves as a collector and receives most of the wastewater coming from many activities including industrial and agricultural. Also, the absence of specified parking areas on the site has caused the cars to be randomly parked everywhere, even in those public open spaces that are left. The pedestrian and public spaces in the neighborhood are missing too, leading to a community that does not interact with each other.

The combination of these continual challenges and intense confusion may occur demoralizing, but in the face of these difficult situations lie opportunities for recreating the future.

Figure 3: Site's Devision in Zones (Base map: Asig Geoportal, 2021)

Figure 4: Existing Zones (Base map: GoogleMaps, 2021)

02 Tirana

by Olta Merhadi, Florian Isufi, Keegan Arnold

Figure 5: The old Sulejman Pasha Mosque (1614-1967) in Tirana, Albania (Lear, 1848)

At the beginning of the 17th century (1614), Tirana was founded by Sulejman Pasha who built a mosque, a public bath, and a bakery. Tirana's center was formed by the intersection of four road arteries, laying the foundation for the Small Bazaar marketplace. This bazaar constituted the focal point of the city's growth (Encyclopaedia Britannica, 2019).

The first regulatory plan of Tirana took place in 1923 while Armando Barsini designed the first comprehensive plan to be implemented in Tirana in 1926. The second regulatory plan was focused more on regulating infrastructure and increasing services for citizens. Creating large squares was an integral part of this plan and throughout the process many roads and small public spaces emerged (Tashi, et al, 2014; Doka, et al, 2013).

The constant development of Tirana led to additional regulatory plans to be developed in 1928 and 1929, designed by Austrian architect Wolfgang Kohler and Italian architect Florestano Di Fausto (Tashi, et al, 2014). This period was accompanied by the introduction of new districts. Opposed to the old ones, streets increased in width and the radial axes that emerged were given an important role and were planned as broad major thoroughfares. This period also saw an increase in the influence of Italian architecture in the city of Tirana which was accompanied by the formation of many urban developments that doubled the surface area of the city and expanded its borders to a size of approximately 4.5 km2 (Doka, et al, 2013; Nepravishta & Gjergj, 2020).

After the fall of communism, the need for a new city plan was inevitable due to the increase in demand for housing, the unpredictable expansion of industrial areas, and the intermingling of different building zones. The main objectives of post-communist planning were (Doka, et al, 2013):

1. Fulfillment of housing requirements by 2005, determination of new spaces for industrial development, addition and improvement of the road network;
2. Creation of an outer ring that would be used for heavy traffic and would also serve for the most part as the peripheral border of the city; and
3. Reduction of housing density by increasing the city area.

These goals are added into the current regulatory plans, furthering the objectives of clearly defining land use, regulating density and the heights of buildings, and correcting deficiencies associated with informality(Doka, et al, 2013).

Informality in Tirana

With the fall of communism in Albania, as in other Eastern European countries, quick political and economic reforms followed. "Like the ambitions of most uprisings in history, the goal of the 1989 revolution was to undo the old system by tearing down the tenets of a crumbling political structure" (Lula, 2019).

Many irregularities accompanied the transition from communism to democracy and the lack of control for relevant institutions facilitated the informality that affected almost every sphere of life for the citizens. A different story altogether can be told for the years under communist rule. During this period, the economy was centralized with all means of production existing under state control. Private enterprise and ownership of any sort were strictly forbidden. Transportation services were insufficient with only buses being present in Tirana and their services lacking quality. Car ownership was not permitted. Thus, active transportation (bikes, walking) was adopted out of necessity (Pojani, 2010).

During the early 90s, Tirana experienced the first appearance of urban sprawl in the suburban areas of Tirana as the prior regulations that were put in place to control this very phenomenon were lifted. This resulted in the construction of a large number of informal build-

Figure 6: Tirana plan of 1923 (Nepravishta, F. & Thomai, G., 2020)

Figure 8: (above) Plan of 1941 (Shkreli A., 2018)

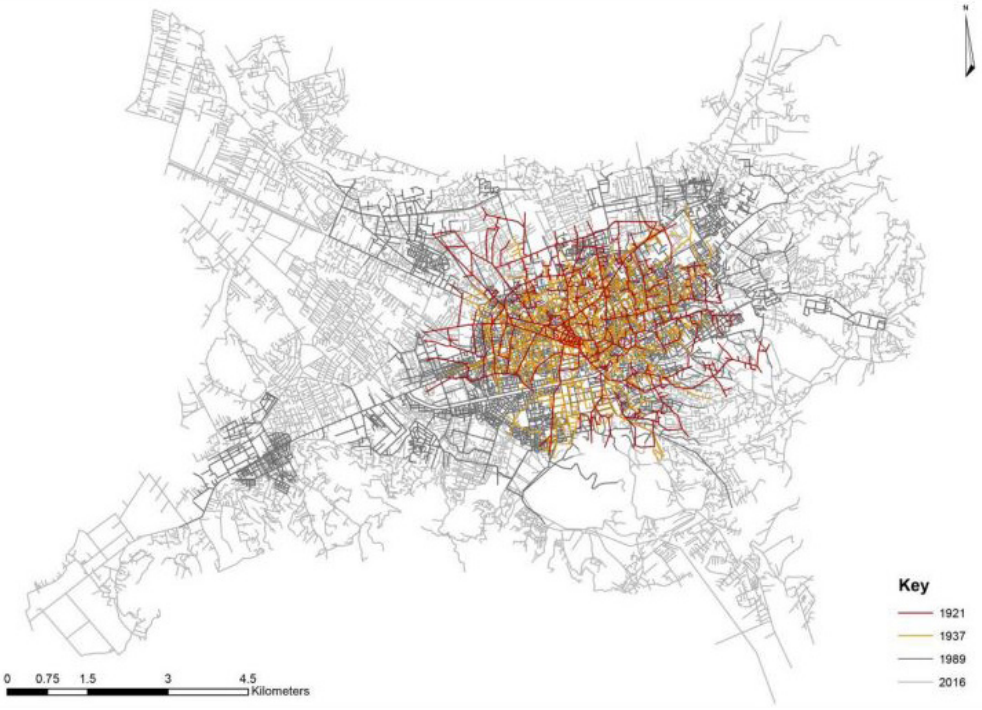


Figure 9 (right): Tirana city 1921 to 2016 (Dino B. at al., 2017)

ings with the building stock built after 1990 being characterized by deplorable conditions, decay, and lack of amenities (Nepravishta, 2004). It was estimated that the majority of the buildings built between 1991-2000 are informal. Thus, their structural integrity could be questioned as potentially dangerous.

Informality appeared not only in the housing sector, but also in other segments. A report by the World Bank on the progress of small and medium enterprises in the Balkans states that informality in the economy of Albania is at 50%, resulting in a more significant tax burden on the formal and sector with the negative impact occurring in the form of less expenditure on public utilities, increased taxation, lower productivity, and economic growth in the short run (Tirana Times, 2019).

Tiana is not only the capital but also a municipality in Albania. Municipalities fall under the division of Albania into counties and districts. Tirana is located in the Central Albania Region, in the County of Tirana. The local government of Tirana (the municipality) consists of two tiers of government: the elected city council which is led by a mayor and 11 smaller administrative units for each borough (mini bashki). The role of the mayor is powerful in Tirana and the boroughs have relatively little power in comparison (Pojani, 2010). The mayor is directly elected every four years. Together with their cabinet, they form the executive branch of the municipal government. The legislature of the municipality is the Municipal Council of Tirana; a parliamentary body consisting of 61 members serving four-year terms. Tirana is also home to a district court as well as to the highest level central government courts and judicial bodies. Regional governments are made up of proportionally appointed delegates to the regional councils. In this way, the regions are not fully self-governing (Pojani, 2010).

The president, prime minister, and parliament of Albania have their seats here. Clear divisions of power between local and central planning authorities characterize the region and projects approved by the city have been contested by the Albanian government, setting up conflicts between planning authorities at the different governmental levels (Pojani, 2010). Municipalities have many roles, including organization of recreation, culture, and religion, pre-university education, and community services such as waste collection, sewer management, and public lighting. The Agency for Legalisation, Urbanisation and Integration of Informal Areas and Buildings (ALUIZNI) (Agjencia e Legalizimit, Urbanizimit dhe Integrimit the Zonave dhe Ndertimeve Informale) is the government agency responsible for coordinating the legalisation process in Albania.

Figure 7: Tirana plan of 1929 (Nepravishta, F. & Thomai, G., 2020)

Introduction to the Site

by Irini Bregasi , Shiplu Chand Avi

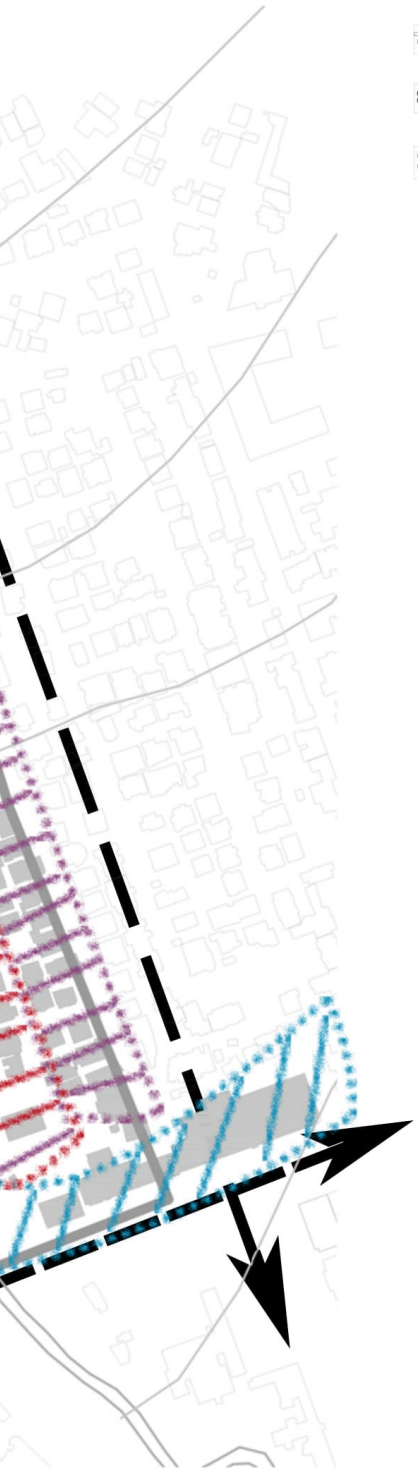
In both socialist periods Tirana experienced a boom in population and urbanization (Instat, 2022). This rapid influx of population initiated the formation of informal settlements in several parts of the city. The study area is one such informally developed neighborhood with around 600 dwellings and 1 km2 area. The area mainly consists of residential houses. Like many other parts of Tirana, this neighborhood is not covered by municipal services. The study area, Astir, is one of the peripheral areas of the city of Tirana. This informal settlement was initiated within the last 30 to 40 years. Consequently, it does not have a considerable history (Instat, 2022).

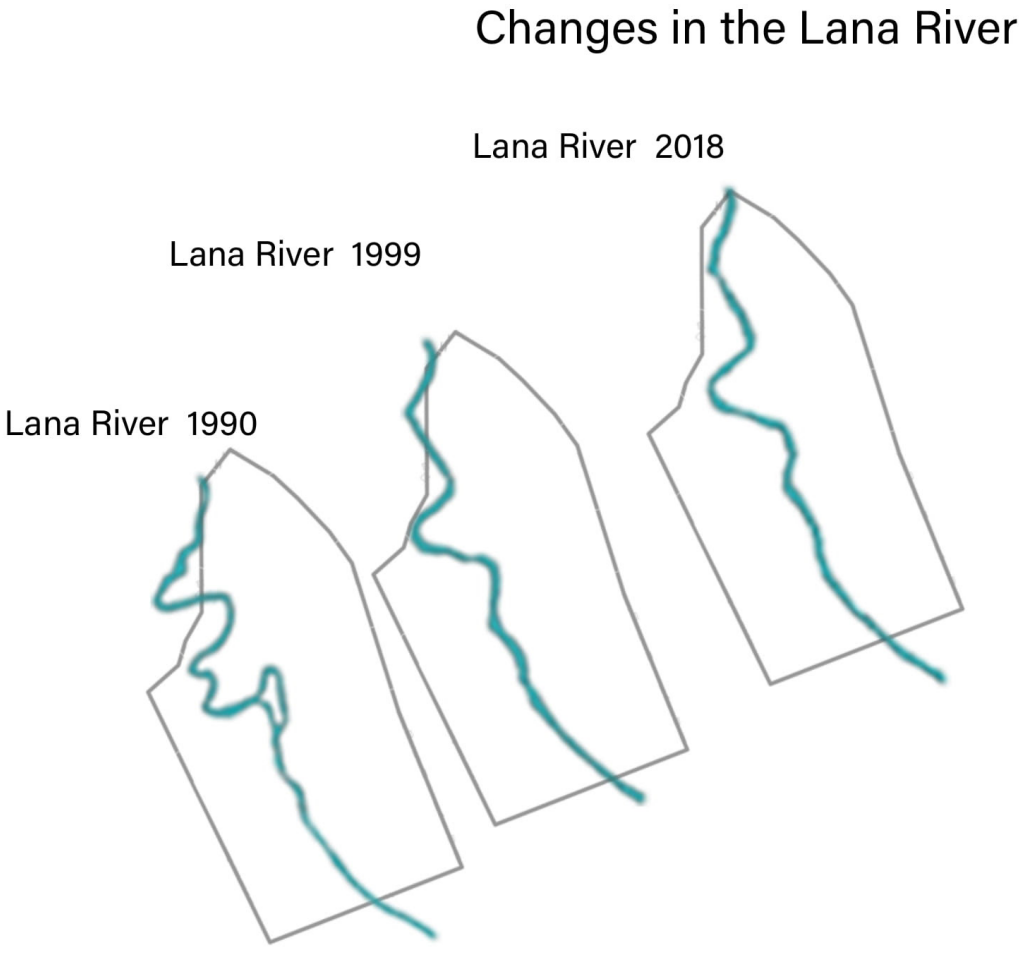
The most important geographical feature of the settlement is a river named 'Lana' which crosses through the neighborhood. This river has changed a lot in shape, size and quality because of the uncontrolled exaltation of the neighborhood (ASIG, 2022). This short period of development can be seen as 3 phases. The built form developed before 1995 did not hamper the river flow and shape. During the early 2000s, a major development occurred along the river bank and it changed shape and quality of the river. The most recent development occurs along the two major roads passing the site (Figure 10). Most of the existing buildings in this neighborhood are one or two-story buildings. From the economic point of view, it is a transitional area for people.

Figure 10: Development of Study Area & consequent changes of the Lana river (Base map: Asig Geoportal, 2021)

People from rural areas move to the city of Tirana, stay for some years and after certain years of living and amount of money earned they try to move to other parts of the city which have better facilities (Blerta.H, personal communication, 2021). Like many other parts of Tirana, this neighborhood is not covered by municipal solid waste collection services (Alcani et al., 2010).

The most notable geographical feature of the settlement is a river named 'Lana' which cuts through the neighborhood.





03 REAP Scopes

Water

Energy

Mobility

Waste

Sustainable Urbanism

"Design a sustainable urban system, which creates physical and mental space to adjust the urban form at any moment in time, anticipates uncertain, unexpected and unprecedented change, and grows stronger and becomes more resilient when uncertainty impacts on it". – Roggema (2016)

Sustainable Urbanism

by Gabriela Lugones

In the context of REAP, we focus constantly on sustainable urbanism. This term, translated into actions, allows us to develop the city from a more ecological perspective, always taking into account the social, economic, and environmental spheres. At the same time, in our field of academic study, it is interrelated with other areas such as water, energy, mobility, and waste. This interrelationship allows us to understand the importance and scope of sustainability. It is a complex issue that needs to be approached from different fields and perspectives.

According to Hernandez (2008), sustainable urban planning comprises certain fundamental principles that range from urban connectivity, diversity of use, diversity of housing typology, cultural diversity, neighborhood structures, sustainable mobility, public space, and quality of life.

In addition to responding to the immediate problems of the environment, sustainable urban planning must also be capable of integrating a vision for the future. Its principles must consider the green structure, water, ecosystems, soil, and air. For the latter, two approaches can be considered. The first refers to increasing the environmental qualities of cities to promote the regeneration of their functions, and the second the creation of resilient spaces (Roggema, 2016).

Within the REAP context, we also understand sustainable urbanism as multidimensional. It must be approached considering all the principles mentioned in the previous paragraphs and must also consider the socio-political structure. In other words, to achieve sustainable urban planning, the criteria of the inhabitants must be taken into account (citizen participation) and its guidelines must be included in the legal regulations to lay the foundations for the future.

In the context of Tirana, the municipal government developed a Green Action Plan in 2018 to establish environmental infrastructures as priorities to solve the challenges of the future. Areas such as transportation, green and blue infrastructure, resource management, water, energy, and resilience are taken as main strategies for developing this plan. A detailed elaboration of the actions, processes, and procedures necessary for the implementation of this plan has been carried out.

Notably, the institutions at the head of the political structure are taking the initiative to transform the city with environmental basis. However, it is also essential to recognize the value and importance of the knowledge and needs of the community and take them into account in the planning processes. That is why it is necessary to implement ideas at the city level and the neighborhood and housing scale. Decentralized implementations of sustainable strategies ensure their continuity in the future. Finally, education and awareness of the population is one of the most effective tools to achieve change in the current context.

Energy

by Emmanuel A. B. Yiadom

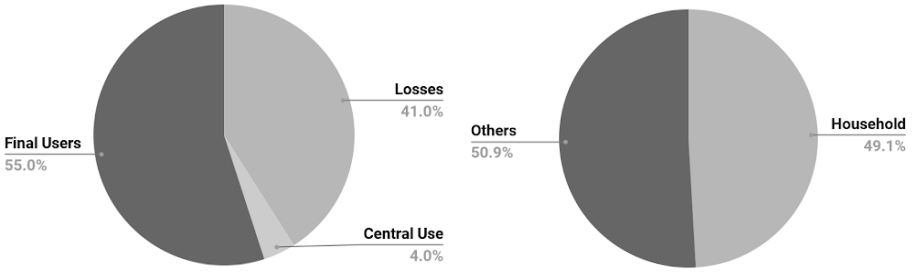


Figure 11: (left) Distribution of Albanian electricity consumption (right) Share of households in Albanian end consumption (Bidaj et al., 2015)

The share of renewable energy in the total final energy consumption stood at around 17% globally by the end of 2018 (UN-SDGs, 2021). While this is a major improvement on previous numbers, it also shows that the world has still a lot to do to balance the renewable and non-renewable energy ratio.To improve upon the numbers and expand the use of renewables, international corporations and governments have put in effort to promote clean energy research, technology, and the promotion of investments into energy infrastructures and energy technologies (UN-SDGs, 2015).

It is at the heart of such innovative and developmental ventures that the Resource Efficiency in Architecture and Planning (REAP) 'energy' supply scope is defined. It is a research intensive, interactive, and multidisciplinary discourse that explores various infrastructures and technologies that maximize the use of renewable resources to provide energy in the various sectors of the economies of the world. Efficiency, sustainability, recycling, and re-usability of resources in energy supply technologies are at the center of the program. The scope also addresses efficient consumption of energy through building retrofitting, use of low energy demand appliances, and electric mobility, just to name a few. The core of the REAP's vision is to match efficient energy supply with sustainable energy consumption to generate a maximized effect of efficient energy management.

Over the past decade, REAP has formed formidable alliances with different developing economies, mostly outside the European Union, through university faculties. Not only to study the energy dynamics of the cities of partnering universities but more so to provide the opportunity for its able and multicultural students to develop innovative solutions for these cities – something that broadens the scope of research into energy technologies even further and widens student's experience during the program's third semester.

The 2021/2022 Winter Semester has seen REAP partner with the FAU of Tirana, Albania, to study and develop resource efficient methods and technologies for sustainable energy management in urban informal settlements in the city of Tirana.

What makes Tirana's energy sector management very interesting to study is the fact that the country's non-transport energy sector relies on a 100% renewable source coming from Hydro Power Plants (HPP) for electricity which is one of the clean renewable sources of energy and is considered more environmentally friendly compared to others such as coal, oil, or nuclear energy (IRENA, 2021). Although the city is renewable energy-dependent for non-transport energy demands, in the wake of increased emissions of greenhouse gases and the resulting global warming effects of unpredictable extreme climatic conditions, electricity supply for the city has been largely unreliable, as HPPs depend on rainfall amounts received in areas of the sources of the rivers where the dams are constructed (Xhitoni, 2013; IRENA, 2021).

It is estimated that about 80% of the power produced is lost technically through transmission and distribution from the north to the south. What compounds the problem even further are the non-technical losses coming from electricity theft through unmetered connections and cable thefts due to malfunctioning institutions and poor infrastructural development to manage informality, especially in the housing sector (Xhitona, 2013; IRENA, 2021).

Figure 12: Lake Bovilla – main source of water for the city of Tirana (Oseku, 2019)

Water

by Amr Mobasher

Water is one of the important natural resources. In the past, civilizations were built next to water sources. Among the most famous examples are civilizations like ancient Egypt (Nile River), the Fertile Crescent (Tigris / Euphrates), ancient China (Yellow River) and ancient India (Indus), which is why it is necessary to preserve it. Water management includes the water supply, wastewater, flowing water, and storm water. Each of these topics are included in the REAP scope as part of urbanization and sustainability. "According to the law on managing water resources, it is necessary to establish the management plan of the river basin, which is the Bible of water resource management. If this is missing, it means that nothing is being done to manage them. Water resources are not just the waters flowing in the rivers, or staying in lakes and reservoirs, but also exploited and even polluted water resources. It is for this that all actors and stakeholders that use, exploit or even pollute these resources should come together in frame of the management plan of the river basin," Adhami, a conservationist and a freshwater expert argued. (Tirana Times, 2020)

Water in Tirana is supplied from Lake Bovilla, wells, and groundwater to cover all the needs of the city. One challenge of the municipality is that the total population of Tirana is increasing fast, causing a disruption in the water supply to the population, leading to the citizens trying to store water on their property. Water supplier Ujësjellës Kanalizime Tiranë (UKT) plans on upgrading the infrastructure by adding 355,000 linear meters to produce 93.2 million m3/year (UKT,2021).

The existing sewage system of Tirana is a combined collection system without a treatment facility. Almost all sewage collected through combined sewer pipes is introduced to the interceptor sewer up to the discharge point located downstream of Lana River (JICA, 2012).

The informal settlement's encroachment on the river's land causes the pollution of the river water by discharging the solid waste and wastewater directly into the river. The flooding risk is high due to the high average annual precipitation of 1500 mm (max. 120 mm / month), the dumping of solid waste into the river, narrow bridge inlets, and direct waste water discharge into the Lana River due to a lack of treatment facilities (TU Delft, 2018).

Tirana's urban history does not go back far. It became Albania's capital city in 1920 when its population was only 17,000 (Pojani, 2011). After the fall of communism, migration limitations were lifted and people from all over Albania started migrating to Tirana. From 1990 until today, the population has increased from 300,000 to 800,000. Private car ownership was not allowed during the communism era and residents were mostly using buses, bicycles or walking as means of transport. In 2010, two thirds of inner-city households owned at least one car. For Tirana residents, car ownership is not only a mobility option, but is also seen as a status symbol after many years of repression (Pojani, 2011). However, the city is not designed to handle this level of motorized traffic. Additionally, issues such as lack of adequate and efficient public transport and safety concerns for pedestrians and cyclists indirectly contribute to problems such as congestion, accidents, and air pollution (Directorate of Transport, 2021). Even though the share of public transport in Tirana's modal split is not very low (36%), users are dissatisfied. Among main reasons are the lack of reliability, lack of connectivity, overcrowded buses, and poorly conditioned vehicles. There is a tendency to use bicycles instead of buses; however, users state security concerns. Similar issues are also prevalent for pedestrians. Common complaints are that pedestrian sidewalks are not in good shape and car drivers are not being respectful towards pedestrians (Directorate of Transport, 2021). Inclusiveness is another aspect that should be enhanced. An increased number of residents creates a denser and more dynamic city. However, it also creates social isolation if transport services are not distributed equally. Without properly functioning public transport, disadvantaged groups living in the periphery neighborhoods have difficulties reaching services in the city or their jobs (Pojani, 2011).

The Municipality of Tirana, in cooperation with international institutes such as European Development Bank and GIZ, contributed to detailed reports on sustainable mobility options in the city which includes users' opinions and detailed analysis of current cases and various scenarios (ARUP et al., 2018; Directorate of Transport, 2021). Main strategies address many of the above-mentioned issues within the frame of long-term planning and more inclusiveness for everyone involved. The overall goal is a cleaner city which can ensure safety with efficient use of resources (Directorate of Transport, 2021).

by A. Nil Sensu

Mobility

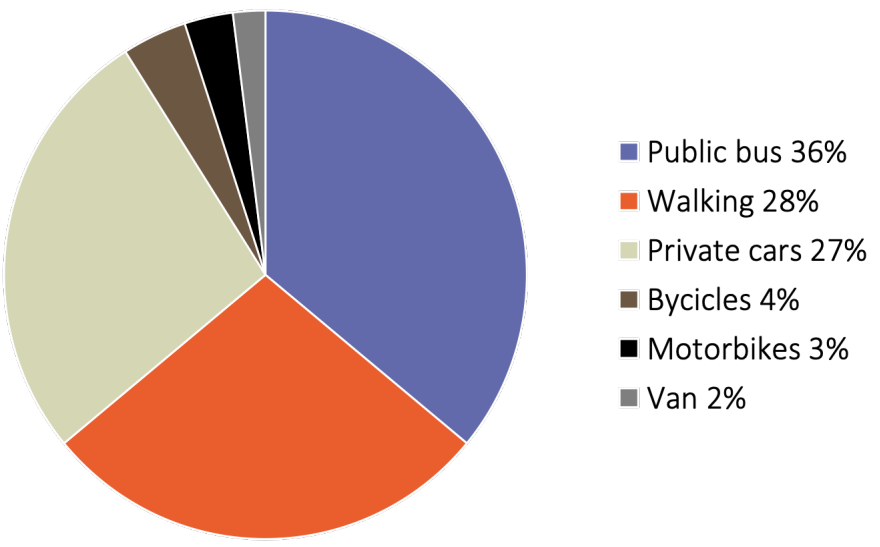


Figure 13: Modal Split in Tirana, 2009 (Directorate of Transport, 2021)

Figure 14: Bird view of waste near Lana river, Astir (Shehi et al., 2021)

by Sakhil Chaudhary

Waste

Albania has been one of the top importers of waste in the European subcontinent, with around 12,000 people working in this informal sector. However, despite the ban on waste imports, hundreds of tons of waste are secretly sneaked into the country, mocking the environmental pledges (Likmeta, 2012).

Tirana's waste management practices are still dominated by a linear collect-and-dispose approach instead of sustainable waste management. The majority of waste goes to landfills wherein the organic waste sums up to about 50 percent of the disposed waste. This produces methane in these landfills — directly contributing to climate change. In 2018, with the inauguration of a waste-to-energy (incineration) plant, the waste is annihilated, generating electricity but at the same time, it succumbs to a greater problem of high carbon emissions (GIZ, 2021).

19 % of the waste is segregated for recycling, which is supported by some private recycling companies in Tirana, handling waste management up to some extent. The mismanagement in this sector also results in the leakage of plastic waste to the Mediterranean sea (Taylor, 2020).

Looking at the future plans of Tirana, for instance the Tirana 2030 Master-plan, talks about the revitalization of the public spaces, green energy, development of commercial and residential spaces, consideration of agriculture in the urban context, however completely overlooks sustainable waste management. Albania is in a dire need of a concrete and integrated waste management solution to reduce carbon emissions from landfills and adopt eco-friendly waste disposal.

In 2014, the Balkan nation was granted the European Union candidate status. As a part of its EU integration process, several initiatives are being taken up to align with the EU environmental standards. Therefore, the modernization of the solid waste management system through the development of a roadmap towards a circular economy and extended producer responsibility to combat climate change is in full force (GIZ, 2021).

Tirana also recently adopted the National Waste Management Strategy with the support of GIZ (German Corporation for International Cooperation). Even though these policies are implemented, littering of waste including plastics and recyclables occurs in green spaces. Open burning and garbage disposal in and on the banks of Lana river still persists, and although perhaps only in the informal settlements, the issue still cannot be ignored. The residents of the Astir neighborhood complain about foul odors, non-availability of waste bins, and improper and untimely waste collection by the municipality. According to the survey of the Institution for Democracy and Mediation(IDM), 47% of Albanian citizens believe that officials were irresponsible and not transparent in their decisions, leading to low levels of trust in the municipality (Proda, 2016).

Additionally, the failure of some pilot projects such as the segregation of waste at source, showcases that bottom-up approaches via intensive fieldwork in small neighborhoods are crucial to make effective waste disposal an integrated part of the waste management system.

04 REAP Interventions

by Aaron Wieland

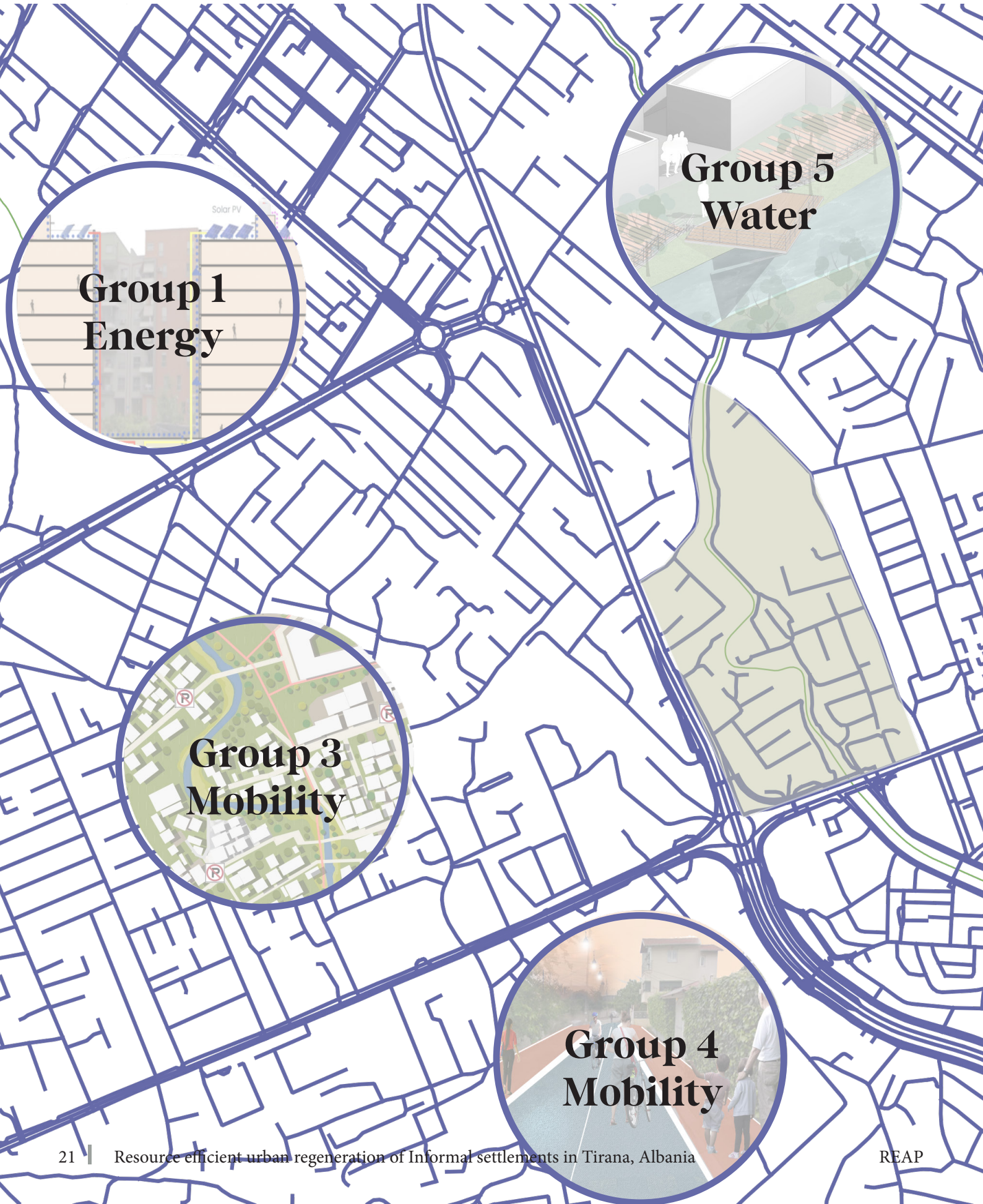


Figure 15: Map of the Site with Intervention scopes for REAP
(Base map: ASIG portal, 2021)

Energy

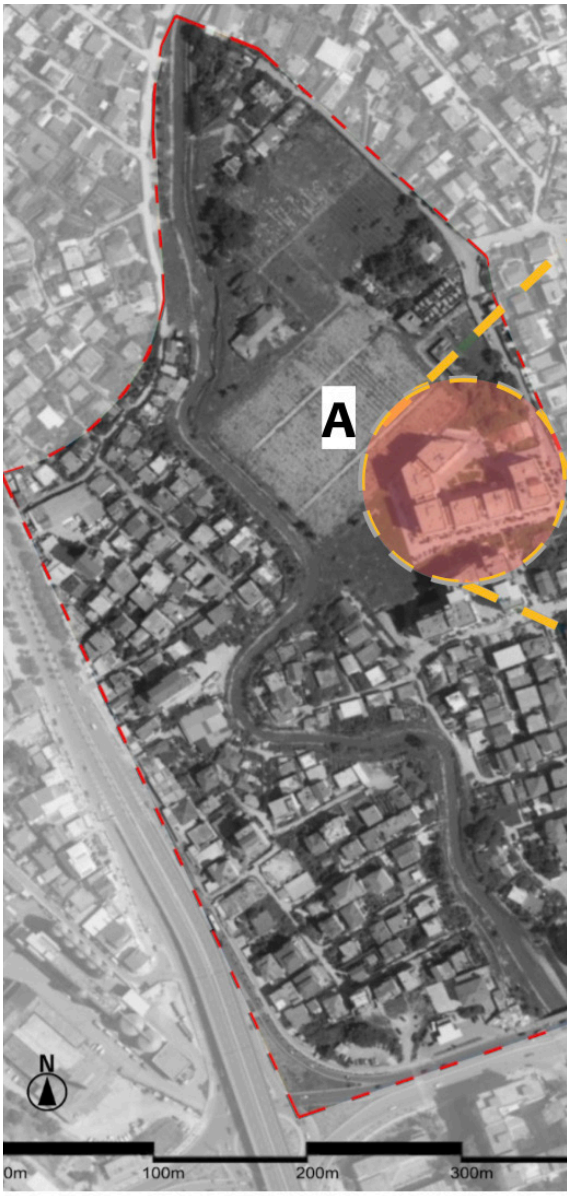
A hybrid energy solution

The conundrum of Tirana's energy situation stems primarily from an over-reliance on hydro power plants (HPP) as the city's population grows in tandem with the increasing unpredictability and extremes of global climatic trends, exposing the cracks not only in the electricity supply but also in the transmission and distribution system's management. While the HPP is located in the north, roughly 80% of the power generated is lost due to transmission and distribution issues. Non-technical losses resulting from electricity theft through non-metered connections and cable thefts exacerbate the problem (Xhitoni, 2013). The weak institutional structures along with the overwhelming urbanisation have accommodated the formation of informality in several neighbourhoods across the city.
Since the European Union's sustainable energy policies discourage the use of non-renewable energy sources such as coal, oil, gas, and nuclear power, a high oil-dependent transport sector in Albania's energy mix would be required to promote the use of electricity-dependent transport, putting undue strain on existing energy infrastructures. To fulfil the increased power demand, other renewable energy sources should be investigated and utilised. Other renewable energy sources therefore ought to be explored and utilised to meet the growing power demand. In light of these considerations, the goal of our project was to investigate the possibility of solar energy production in providing a decentralised hybrid solar energy solution for multi-storey buildings in Tirana's informal settlements. The main research question is,

How can we use the solar potential to tackle the energy challenges in the informal settlements of Tirana, Albania through a pilot project?

To answer this question, we streamlined the research even further with the sub question and explore the possible use of potential excess of electricity generated from the hybrid system, and maximise liveability. How can this pilot project provide a hybrid solution to meet the electricity, domestic hot water and clean drinking water demands for a sustainable multi-storey building?

Group 1

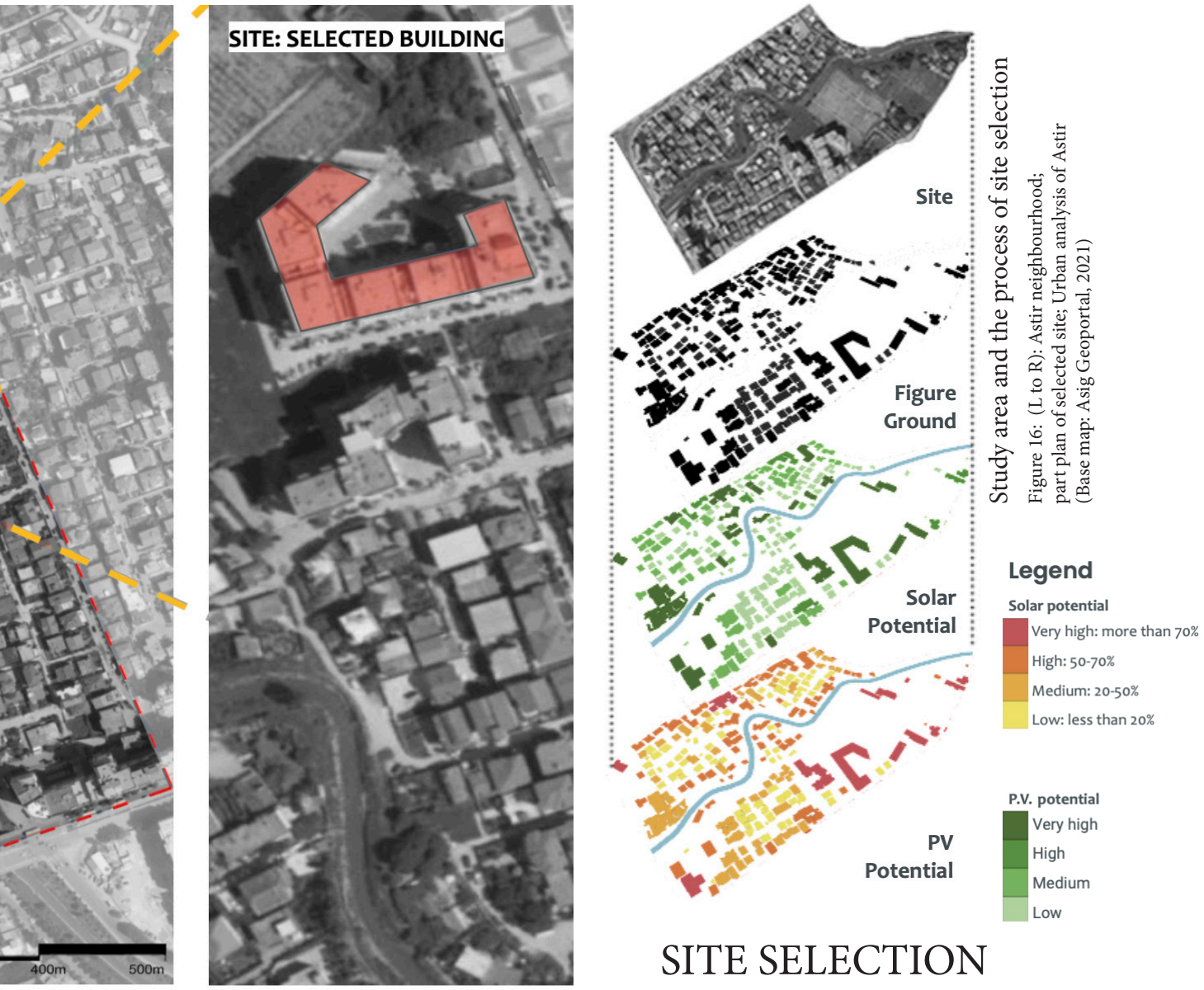


SOL–ASTIR

A hybrid solar energy solution in Urban Informal settlements in Tirana.

Analysis

A critical analysis of the study area was carried out to select the specific site. The liveability of the neighbourhood is assessed using metrics such as open space ratios, district coverage ratios, water and land coverage ratios, and the ratio of public and private parks in the area. With a dearth of public areas and accessible water bodies, the neighbourhood rates low in terms of liveability. This is primarily an informal hamlet with family homes scattered along the Lana River. However, there are some developments that are multi-storey buildings and house about 200 families. The procedure of choosing a specific site was finalised by juxtaposing layers of filters and then calculating the likely real-time consequence from that site. The analysis delves deeper into the solar potential of the site after applying the liveability ratio filters. Some areas have a high solar potential, but it's also crucial to check the feasibility of installing PVs. For this,criterias such as blockage on the roof, roof angle, shade and direct light ratio, as well as grid connection capability, were investigated.



Study area and the process of site selection

Figure 16: (L to R): Astir neighbourhood; part plan of selected site; Urban analysis of Astir (Base map: Asig Geoportal, 2021)

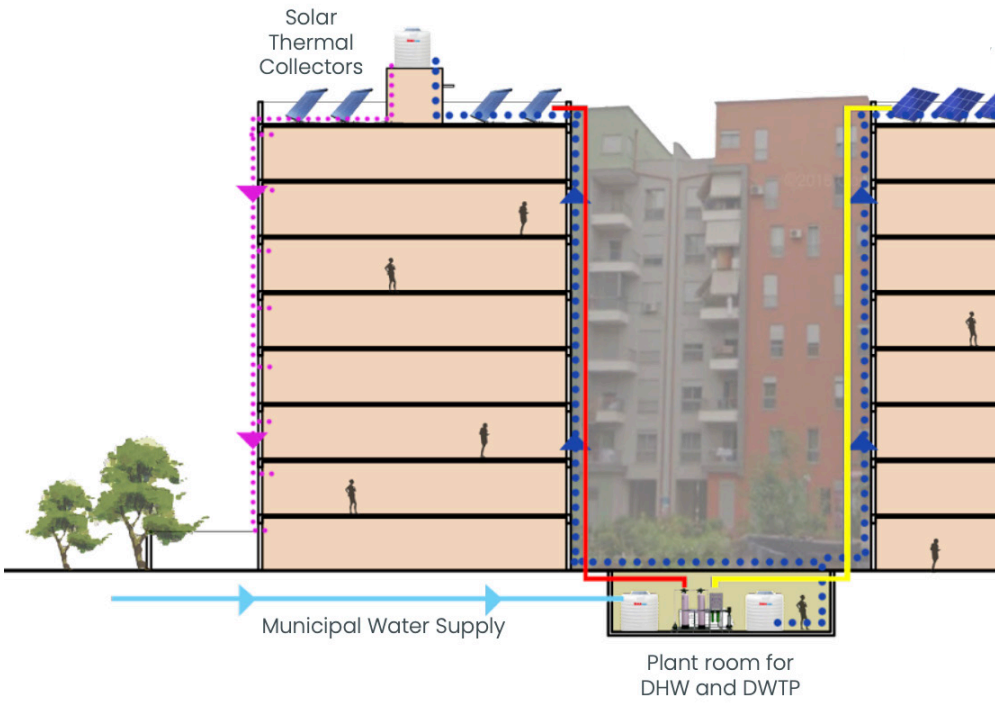
SITE SELECTION

The combination of a flat, wide roof space (2,740 m^2) and a multi-story residential structure created a tremendous possibility for a direct effect intervention. Secondly, because of the minimal legal concerns and simplicity of execution, such a scenario boosts the logistical feasibility of the pilot. It is a great scenario for establishing a centralised local distribution network and bridging the gap between PV, domestic hot water (DHW), and drinking water treatment technologies. A high number of comparable multi-story buildings may be found not just within a 500 meter radius of our research area, but across the whole municipality of Tirana.

Concept Development

The study evaluated many criteria of analysis, including elements impacting the project's applicability in the neighbourhood. This project's hybrid nature combines photovoltaic and solar thermal collectors to deliver power and domestic hot water to residential structures. The water filtering system will be powered by the PV's extra electricity. This necessitates precise data and a clear project plan that will not only entice investors, but also guarantee the intervention's large-scale practicality. The authors decided to use a pilot project strategy to overcome three major obstacles in the neighbourhood due to the limited time available for study, resource availability, and institutional structures in Tirana. A project of this sort is the first of its kind in the city, with net and sub-metering laws not yet defined for a project with a cluster of residences and many owners. As a result, it is easier to construct the system using a simpler regulatory model.

Figure 18: (Above) Street view of the site (Below) High potential of similar multi-storey residential buildings near the pilot (Source: Google maps, 2022)

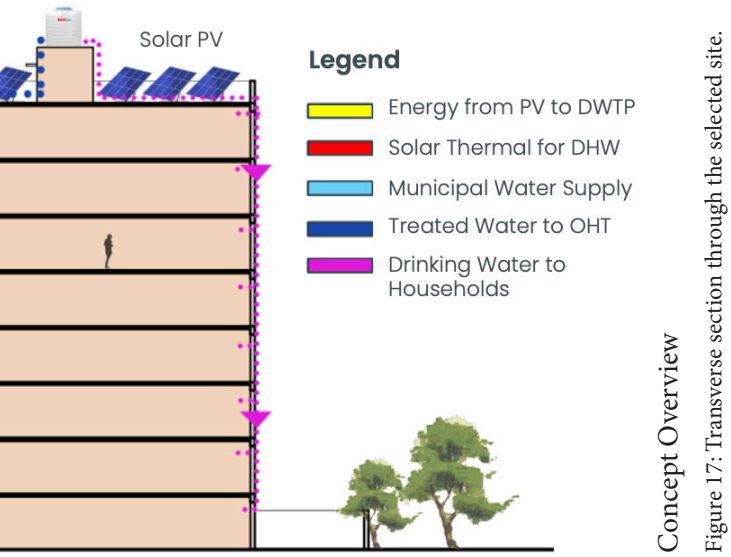


Intervention Proposal

A Hybrid Pilot Project

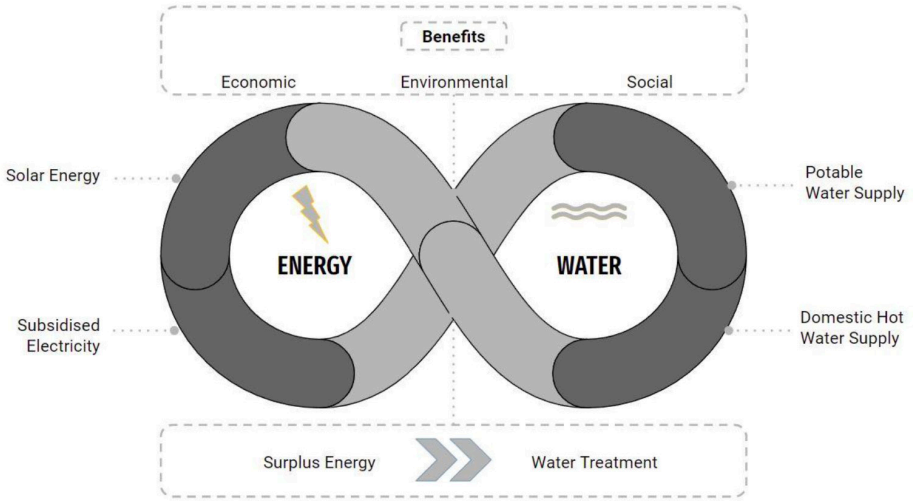
The PV system establishes a micro grid that eliminates transmission and distribution losses, takes use of solar potential, and generates 284.1 MWh/a of renewable power to cover the building compound's electricity needs. On an annual scale, the energy quantities linked to the operation of the hybrid system are estimated, and there is a surplus electricity of 75 Mwh/a. The first choice was to sell the power to the grid and earn from the FIT system in Tirana, while the second option was to choose to increase the compound's independence. The decision was made to follow the latter viewpoint, and the first concern was to address the issue of safe drinking water supply. Even if the municipality filters the water, because the infrastructure is too old and dilapidated, this water is combined with sewage water making it dangerous for public consumption. That is why the residents of the city buy bottled drinking water. Hence, the proposal of purifying the municipal water on site seemed plausible and this water purification plant required 14.6 MWh/a of electricity that was taken from the excess.

In return the solar powered water heating system and the water purification plant provide 29,000 litres of hot and 1,330 litres of purified drinking water per day respectively to the residents. Based on the simulation results, the PV system generates 284.6 MWh electricity per annum which is multiplied by the subsidised rate to get per annum earnings and consequently the earnings for 20 years. Similarly, the cost of a litre of water is multiplied by the demand and relative calculations are made for the yearly and 20 years earnings. These earnings have been summarised in the Table 1 highlights he payback period which is around 7 years.



Concept Overview

Figure 17: Transverse section through the selected site.



	PV System	Solar Thermal System	Water Purification
Commodity	284,627 kWh/a	100,000.00 €	485,450 ltr/a
Rate	8.4 cent/kWh	—	0.05 €/ltr
Earnings (per annum)	23,908.66 €	5,000.00 €	24,273.00 €
Earnings (20 years)	478,173.00 €	100,000.00 €	485,450.00 €
Total	1,063,623.00 €		

Table 1: Summary of feasibility analysis of Sol-Astir hybrid project

Conclusion

Through the use of simulation software and published research an innovative hybrid solution was designed that provides on-site electricity generation and consumption, DHW, and purified drinking water to the residents. Although the quantities are based on annual sums but at instantaneous levels, a grid connection will always be required. The intervention focuses on increasing sustainability and reliability related to DHW and the mixed-use of electricity in the residential sector of the informal settlement. This forms 79% of the electricity consumption while the remaining 21% of the consumption is related to space heating and cooling. The authors believe that better building insulation and retrofitting is a more sustainable approach to solve this portion of energy use. Therefore, space heating and cooling were left out of the scope of this study.

By transforming a consumer neighbourhood into a prosumer one, the proposed intervention demonstrates the potential to enhance the inclusion of the informal settlement within the fold of the city. Otherwise considered as problems to be removed, such productivity adds value to these settlements and transforms their position in the urban fabric. Of the proposed intervention, where the energy-related part brings sustainability in supply, the interdependencies with other scopes enhance the liability of the residents. Moreover, its replicable nature provides flexibility for a city-wide application which can enable and foster the growth of a circular city, Tirana.

Waste

From Waste to Resource

Group 2

Introduction

Tirana has been witnessing major changes since the fall of the socialist regime. The high pace of the city's expansion and densification came along with uncontrolled construction and the formation of informal urban settlements (Alcani et al., 2010). With the lack of infrastructure planning and services, especially in some of the informally built areas, the urban metabolism is facing many challenges. In this project, the aim is to address sustainability and well-being in the city, with a focus on the waste sector.

With the collected background information, the observation and inputs from the workshop week, and the collaborations with the tandem group, a first understanding of the situation was acquired. Uncontrolled waste disposal and the dysfunctional waste management system are among the core problems of the city, and more specifically in the informal settlement 'Astir'. The interviews conducted in the neighborhood during the first workshop week showed the dissatisfaction of the residents about the uncontrolled waste disposal, especially in open spaces and at river sides, as well as the insufficient waste collection services by the municipality.

On the basis of the preliminary investigation of the situation, and with the purpose of defining a proposal of improvements, the following research questions guided the development of the project:

- Which strategies can be adopted to overcome the challenges and barriers for the implementation of a controlled waste management system?
- How can waste segregation schemes for the neighborhood be initiated and how can this implementation foster development towards more sustainable waste management in the neighborhood?

Methodology

To answer the above mentioned questions, an analysis of the existing framework on the basis of literature was conducted, and an urban analysis with different maps was necessary to understand the physical context of the study area. For defining the concept, vision, and scope of the proposal, expert interviews offered recommendations, and case studies were used as references for measures of intervention. Comparison of processes and techniques based on literature shaped the focus and direction of the intervention. Details of the conceptualized proposal for the household waste management system were defined, a stakeholder involvement plan was elaborated, boundary conditions to overcome the weaknesses and challenges were set, and finally, the expected outcomes were assessed.

Figure 19: Integration of compost yard into urban design of recreational space

"The conceived intervention proposal remains flexible, and can be adapted to the planned urban development project in the study area ,and as a local decentralized solution, it can also be duplicated in other areas of the city."

Analysis

The current Municipal Solid Waste (MSW) system is a centralized and shaped at the national level with the involvement of different ministries. At the city level, the municipality and the contracted collection companies are in charge, while citizens have no responsibilities. This explains the incapacity of the services to overcome the irrational waste generation and disposal. In addition to formal operational stakeholders, an informal system of selective waste collection by waste pickers under poor conditions has a role to direct recyclables to the recycling companies in the city. Attempts from international development agencies to support the MSW management services and infrastructure were identified, while the mobilization of local environmental organizations is limited.

The improvement initiatives for the waste management that have been implemented so far in the city have received significant criticism. One example was the overrated focus to improve the Sharra Landfill. First with the material recovery facility, which showed both the challenges of recyclables' segregation at a late stage of the waste cycle, making segregation a hard task, as well as the issue of recovered materials of low quantity or quality.

Secondly, the new Tirana Waste Treatment Area, a national project for upgrading the Sharra Landfill with a foreign private investment, showed how the strategy of local authorities does not take the public into consideration. At the planning level, the Green City Action Plan (2018) developed by the municipality still addresses the waste management with no precise actions to achieve the defined targets.

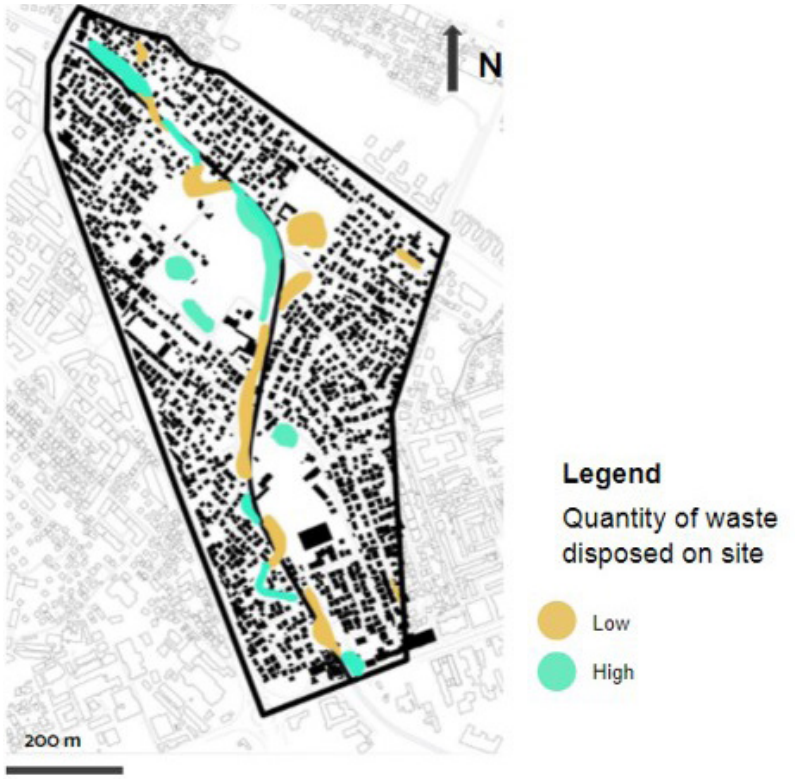


Figure 20 A: Location of waste bins and uncontrolled waste disposal (Base map: Asig Geoportal, 2021)

An urban analysis of the study area was conducted to identify the spatial potentials and challenges. It is a residential neighborhood with low density and around 75% of unbuilt space, most of which is used for car parking or waste dumping. The river and its bed have a misused potential. There is a lack of recreational public spaces and an abandoned tract of land with an old greenhouse. Other aspects that stood out from the analysis of the urban fabric were the poor connectivity and the narrow street network, which makes it challenging for vehicles to circulate and explains the improper and irregular waste collection services. Looking at the dumped waste in the area, most is concentrated along the banks of the Lana river with a few dump sites in the interiors of the project area. Waste containers, identified mainly in the newly developed parts, were overloaded and very few were in the narrow streets and along the river.

Fig. 21: Uncontrolled Waste Disposal in Astir

Concept Development

The scope was to rethink the collection, transportation, and destination of the generated waste from the households in the neighborhood. Considering the Waste Hierarchy, promoting Recycling and Composting is the main target of the proposed intervention.

Upgrading the infrastructure and the services would require an initial investment and building human resources, and it is important to assess the benefits of the scheme to ensure its attractiveness and durability. Community education, motivation and engagement was identified as a critical point for the implementation and durability of the desired behavioral change with waste separation at the source.

During the experts' interviews, they proposed to narrow down the focus of the project by providing a detailed intervention for one of the waste streams, while still having the holistic framework in mind. The decision was taken with consideration of the local generated waste composition and the positive outcomes on the landfill, the environment, and economic activities that would result from diverting organic waste out of the MSW collection system.

Intervention Proposal

The separation of organic and inorganic waste is the basis for the intervention proposal. In a perspective of decentralization, the segregation is at the source and the suggested solution treatment is on the local level.

Waste Collection: Considering the narrow street network, tricycles represent a more flexible and adaptable option.

Organic Waste Composting: With an approximated annual revenue of 100,630 euro, a break-even point is estimated to be achieved between 3-7 years, depending on the marketing strategy of the company because of high competition with chemical fertilizers, the value of given incentives, and other miscellaneous expenses.

Community Involvement Plan and Incentive Strategy: To support the involvement of the community in the segregation scheme, incentives are designed in a form of a rewarding system. Bringing their organic waste to the composting yard, people receive points in exchange; these points are transformed into discounts to be used at the supermarkets. Ensuring a benefit from simple daily actions, behavioral change towards the common goal of a clean neighborhood.

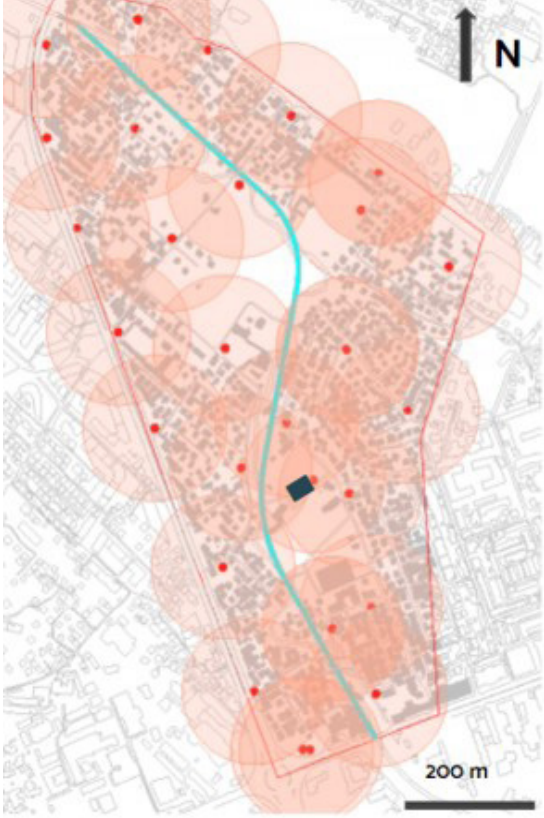


Figure 20 B: Location of proposed bins (Base map: Asig Geoportal, 2021)

Conclusion

The proposed final concept, which incorporates the increase of waste bin coverage and introduction of small vehicles for collection, the composting scheme as a pilot project integrated into the neighborhood context, as well as the incentive scheme for maximum participation and acceptance are a functional, strategic, all-round package to introduce controlled waste management in the settlement, and turn waste into resource.

The conceived intervention proposal remains flexible, and can be adapted to the planned urban development project in the study area ,and as a local decentralized solution, it can also be duplicated in other areas of the city. Waste has a value that should not be neglected. It can do much more than just be discarded or incinerated as it is currently handled in Tirana. Rethinking the waste system would have a considerable impact on the economy, the environment and, society.

Mobility
Parking Management Strategies

Group 3

Introduction

After becoming the capital of Albania In the early 20th century, Tirana was influenced by the Italians, Ottomans, and the Soviets during communism (1944-1990). Private car ownership was forbidden, while the main transportation mode was walking during communism era. People mostly moved around with public buses, bicycles, a few motorcycles, and taxis for special situations (Pojani, 2011). Despite the automobile restrictions, the city provided a substandard public bus system which was overcrowded and dilapidated. In 1990, communism collapsed, and a new era began. The influx of people to the city and those that occupied public or private agricultural land on the outskirts led to a lack of adequate infrastructure such as roads, electricity, water, sewers and transport connections to the city center. Additionally, number of personal cars began to increase exponentially, and walking and cycling were no longer the primary modes of transportation (Lula, 2019). Currently, more than 60% of households own a car, and car ownership is seen as a sign of freedom and social status.

The parking supply is limited because the city was designed for pedestrian and public transportation. The transition to private car use created a wide gap between parking supply and demand, as most cars park on-street and non-motorized road users share the streets with the cars (Pojani, 2011). In addition, public and green spaces were converted into illegal off-street parking lots resulting in a decline of public places in Tirana (Trasporti e Territorio, 2020). The city has created about 8,000 on-street parking slots in four zones, and over 1,000 off-street spaces in 8 facilities.

Furthermore, the mobility situation in the project area has led to environmental and social challenges such as air and noise pollution, frequent traffic congestion, accidents, and safety concerns for non-motorized road users. Solving parking problems would reduce most of these problems, however. Proper parking management strategies could reduce pollution, traffic, accidents, and make the road safer for cyclists and pedestrians. As a result, answering the following research question became the basis for further stages:

How can an efficient parking management improve the social, economic, and environmental conditions of the project area?

Parking Management Strategies

Towards a sustainable Tirana through parking management strategies

Methodology

For this study, an ethnographic qualitative approach was used. A basic historical analysis was initially studied to gather background information on the mobility context into the city of Tirana. Interviews on-site were performed through students from Tirana Polytechnic University to gain local perspectives on the mobility situation in the study area. Existing published reports were also studied to understand general views in Tirana towards mobility.

Analysis and reflections

An analysis of a variety of mobility indicators was conducted to provide a more comprehensive view of the project area's mobility situation. However, inefficient parking management has been identified as one of the most important elements which hinders sustainable mobility in Tirana. The key findings of the parking management situation was the ineffective approach of the municipality of Tirana toward parking management by mainly concentrating on increasing the capacity of the roads and rather than managing the current sources.

Figure 22: Informal Parking in project site

"How can an efficient parking management improve the social, economic, and environmental conditions of the project area?"

Intervention

The essential goal of the intervention was to create balance between parking supply and demand. In order to achieve this goal and answer the research question, a set of strategies were developed which work together and rely on each other. The comprehensive parking management strategies for on and off-street parking management rely not only on factors such as zoning, enforcement, and top-down governing tools, but also on economic motivators and pricing mechanisms to influence parking behaviors to create a complete toolbox for effective parking management. The concept proposal first suggests pricing schemes to limit parking duration, remove informal parking, and make on-street parking facilities more efficient. This goes hand in hand with a designed off-street parking lot, aiming to reduce pressure on busy surrounding streets. In between, as a result of efficient management of parked vehicles, open space would be available for further development of sustainable alternatives, such as bike and car-sharing programs. This intervention would be helpful not only in terms of residents' parking demand, but also to reduce automobile dependency in the project area. (Figure 31), summarizes the parking management concept.

On-street measures

To address informal parking, the main streets are categorized based on whether on-street parking is allowed or not. In order to manage, control and monitor informal parking, pay-and-display strategies, as well as some physical measures are suggested. Based on the estimation, 160 parking spaces could be created along the main roads, and two pricing mechanisms were conceptualized. These fee structures were designed specifically to promote shorter parking stays, and to lead, where possible, personal automobile users to off-street facilities, especially for longer stays.

The first mechanism introduced is a parking time-based charge. This means that the longer a vehicle is parked, the more will be charged per hour. This incentivizes shorter stays by creating a negative economic incentive that worsens for every additional hour a user parks here. See Figures 33 & 34. The second mechanism introduced in this proposal is a peak-demand charge. This is a charge that is added to the parking price at peak times of the day in order to incentivize maximum turnover when parking spaces are needed the most. After addressing informal parking through pricing mechanisms and P&D, the surplus revenue generated can be used for the design of neglected open space areas, being occupied with illegal parking previously. Two possible alternatives would be bike sharing and car sharing facilities alongside main streets.

Figure 23: Parking management proposal (Base map: Asig Geoportal, 2021)

Off-street measures

Eliminating informal on-street parking from the inner streets of the study area would lead to additional problems with people, especially residents, not being able to find available space to park their cars. Developing off-street parking was thought to be necessary to manage the supply-demand factor for parking spaces. The underground parking lot occupies around 8,000 m^2, and comprises of 227 parking spaces, from which 100 are reserved for residents, 12 are used as spaces for car-sharing, and 115 are used for visitors. The car park also possesses spaces for disabled individuals, electric charging points, and bike parking spaces. By under-pricing the off-street facility parking, not only in comparison to on-street parking in the project area, but also in comparison to the Tirana parking "Zone 1" altogether, private car users are incentivized to park their vehicles in the off-street facility.

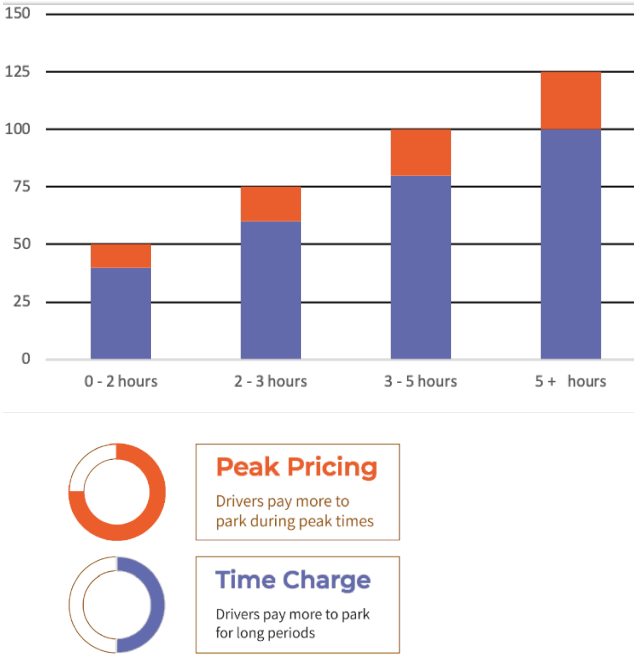


Figure 24: On-Street Price Mechanism

Figure 25: On-street Parking management proposal (Base map: Asig Geoportal, 2021)

Conclusion

Developing a mobility concept for dense informal settlements, like Tirana, can be associated with many different challenges. However, in this mobility concept, a new perspective on the topic of sustainable mobility was taken. Considering the cultural and historical context of the residents of the project site, the necessity of interventions, which addresses the high level of car dependency, was observed. After a detailed analysis, a comprehensive and replicable parking management strategy, including both on-street and off-street parking concepts, was developed to facilitate the transition of Tirana towards sustainable mobility. It would tackle the problem of informal parking by defining a new strategy to regulate these facilities while also creating a balance between supply and demand. Moreover, it would create more space for active mobility, improving social, environmental, and economic conditions of the selected area.

Parking Duration	Total Cost (Albanian Lek)
1 hour	50
2 hours	160
4 hours	400
6 hours	750

Table 2: On-Street Parking Price vs Duration

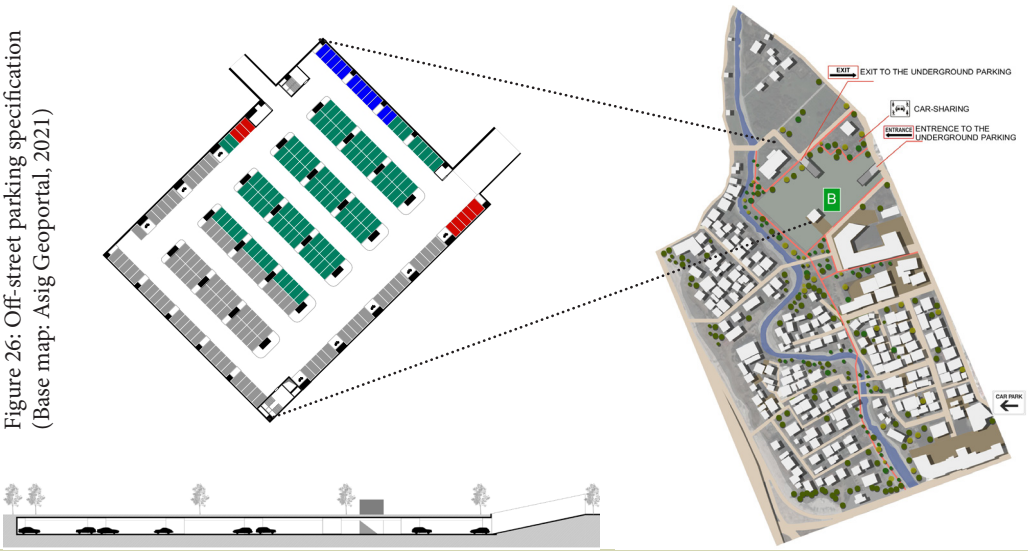


Figure 26: Off-street parking specification (Base map: Asig Geoportal, 2021)

Mobility

Make a Move

Group 4

Current Situation

The present urban situation of Tirana reflects the city's rich history and cultural traditions. Since the fall of the socialist regime, Tirana has seen explosive growth in population through informal settlements, leading to more car-centric development in the past three decades (Spaan, 2020). Although significant efforts and plans have been introduced to move forward with sustainable modes of commute, the outcomes are short of expectations (EBRD, 2018).
The study area is located near the industrial zone located in the western part of Tirana. In the nearby vicinity, there are four bus stations, but accessibility to the stations is limited. Also, the connection via bus to the city is not ideal, as only two bus lines are available for commute and the tickets are non-transferable between different bus routes.

Methodology

The initial impressions of the site area were gathered through interviews with locals and literature research. To gain a deeper understanding of the key problems of the site, information was collected through brainstorming and mind map methods. Then, a problem tree helped to work out the root causes of the problem. Maps about the street hierarchy, public transport, such as bus lines, and bicycle routes were used for visualization. Identification of problem areas leading to the formation of the following research questions:
- Which measures can reduce car dependency and promote an active mode of transportation in the neighborhood?
- Which street transformation strategies can increase connectivity, accessibility, safety, and livability standards of the neighborhood?
As the topic and research questions were defined, more specific and in-depth analysis were required. A stakeholder analysis revealed the interest and impact of involved stakeholders. For this, the drivers and barriers were taken into account, which was influenced by practices and policies. A log frame listed the different steps which needed to be taken, to finish the project, and gave detailed information on how to accomplish each step. Inspiration for redesigning streets to fulfill the demands of the users was taken from street design guides.

Additionally, case studies were used as examples to observe how similar projects were designed and implemented, and if the implementation was successful or made a change to the previous situation.
Street design directions and guidelines

The modal split from 2015 shows that walking is still one of the most used transport modes in Tirana (28%), just after the bus (36%), and shortly before the car (27%). A more recent study done in 2021 shows that over 30% of all trips are made on foot and almost 25% of citizens use a bicycle, out of which 9% prefer to commute via bicycle regularly (TUMI Partners, 2021).
Although private cars have gained more popularity in Tirana, walking is also considered an important mode of transportation. Therefore, streets need to fulfill the demands of all road users. Inspired by the Global Street Design Guide, street design should put pedestrians as the highest priority, followed by cyclists and public transport, to increase active modes of transportation and decrease personal motorized vehicles (Global Design Cities Initiative, 2016).

"Which measures can reduce car dependency and promote an active mode of transportation in the neighborhood?"

Figure 27: Visualization of intervention proposal for S1 location

An analysis of the project area showed several issues, ranging from haphazard street parking, narrow streets, dimly lit pedestrian walkways, to a lack of connection for pedestrians and cyclists to both sides of the river. After careful consideration, the following demands of the street designs were shortlisted to be fulfilled through different intervention strategies to improve the street for pedestrians:

Protection, from traffic and accidents, crime, and sensory perceptions.
Comfort, including offers for pedestrian transport, residency opportunities, seating, attractions, places for communication, and places for play and sport.
Cheerfulness, in terms of scale, pleasant climatic conditions, and positive sensory impressions (UBA, 2017).

Figure 28: Design proposal at S3 location (Base map: Asig Geoportal, 2021)

Intervention

The intervention focus here was mobility from the perspective of pedestrian and cyclist movement in the city of Tirana with a motive to provide simple yet effective necessary reformation strategies
such as the provision of paved road surface, installation of smart street lights, development of pedestrian embankments, and bicycle paths among others. The intervention idea revolved around the provision of safe street spaces, which not only increases the livability standards but also provides a comfortable environment and harmony for better traffic and storm-water management. To implement the strategies, two main proposals were conceived, including street reformation and tactical urbanism.

Street Reformation
To serve the purpose of the design proposal, five locations were chosen from the study area after careful consideration and accessing the factors such as a hierarchy of streets, availability of space, population density, preferred traffic movement, connectivity to public transportation stations, and effects on informal settlements. These five locations are denoted as S1 to S5 in figure 39. Increasing walkability is one of the aims of this intervention. To fulfill the objectives hard and soft measures are considered for each intervention location. Hard measures are the renewal of road paving with permeable material to ease the infiltration and to contribute to slowing down of the vehicles. The addition of lighting is another hard measure that would help for safety. Among the soft measures are limiting traffic speed to 30km/h in secondary streets and a speed limit of 7km/h in local streets as well as the prohibition of car parking. A safe space for bicycle users is ensured either by the provision of a separate bike lane or by intervention at S3 and S5 locations, focusing on increasing the connectivity and livability in the neighborhood.

Figure 29: Intervention locations and street hierarchy of study area

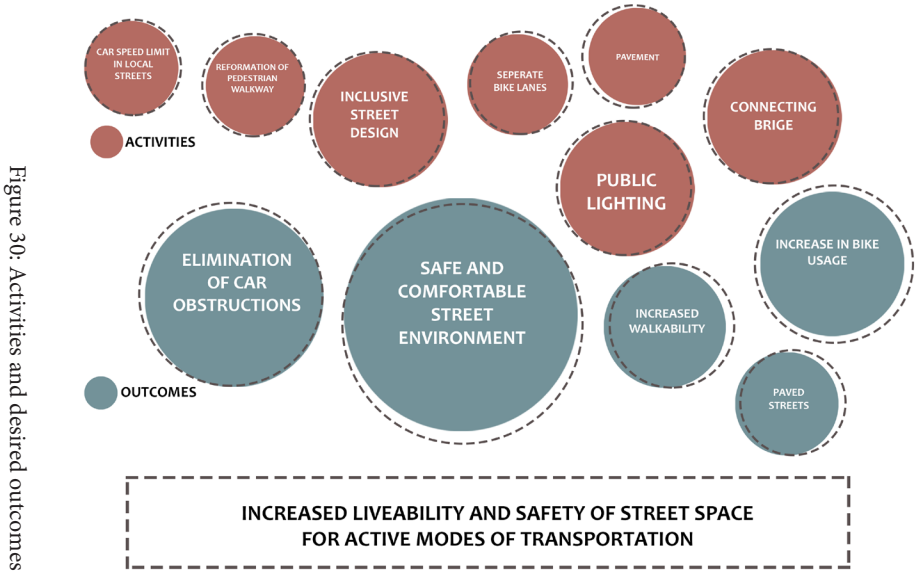


Figure 30: Activities and desired outcomes

"Which measures can reduce car dependency and promote an active mode of transportation in the neighborhood?"

Tactical Urbanism

Community participation is an integral part of the project and tactical urbanism as one intervention would bring the community together to achieve a common goal. The tactical urbanism guide (2022) describes it as a "citizen-led approach to neighborhood building using short-term, low-cost, and scalable interventions to catalyze long-term change". This method of creating change in an urban space is considered effective because it is flexible and can always be altered or amended based on need and assessment.

Conclusion and Reflections

The proposed interventions show a high potential to sustainably improve the mobility sector and livability in general. The interventions are adapted to the different road types in the site and therefore ensure a high improvement of the current situation. Figure 41 shows the activities carried out as part of the project and the outcomes of the successful project would be reflected by an improved connection for both sides of the Lana River, safer streets with better lighting, separate bike lanes, water sensitive design by the use of permeable surfaces and increased activity.

Pedestrians and cyclists are at the center of this project aimed at making active transport modes appealing, friendly, and safer. The proposed project is not isolated from other scopes and encourages cooperation with other scopes. The Riverside restructuring can be complemented by the river recreation, the energy generated can be fed into the grid for smart streetlights, and alternative parking space will be available on the secondary road from the outsourced parking.

Water

Blue Green Corridor on the Lana

Group 5

Introduction

While Climate Change poses a serious threat to people worldwide, cities must also continue to mitigate and adapt to the dynamic "everyday" challenges occurring within their urban environments. Although many urban government bodies remain reluctant to adopt climate action measures, in many cases, the strategies utilized to fortify the environment can lead to meaningful positive impacts on surrounding communities. Resulting from its history as an informal settlement, the study area in Tirana faces a dynamic challenge as illegal waste disposal and inadequate management pose an immediate danger to the Lana River, lack of social cohesion forms a barrier to development, and Climate Change threatens to overwhelm the water body with future floods.

The development and maintenance of formalized water management in Tirana relies greatly upon the Municipal Government, but the city's leaders have greatly neglected the water sector throughout the past century. However, Albania's pursuit of EU status will likely be a driving force behind a large overhaul of Tirana's water networks in the near future. Considering these circumstances, the goal of our project was to approach the issues of water pollution and social cohesion around the Lana River from the bottom-up by utilizing a design vision for physical interventions as well as an inclusive participatory model.

The main question that provides the basis of our research is,

How can we develop public spaces as a means to encourage community engagement in an attempt to revitalize the Lana River in Tirana, Albania?

Fig. 31: Neighbourhood reflection of Astir

"The interconnection between public space, community participation, revitalization, and the Lana River provides the foundational structure and motivation behind our project."

Intervention

Our project's intervention can be divided into multiple phases and aspects. The renaturation of the Lana River within the study area acts as the first phase of physical interventions. This renaturation phase occurs in multiple steps: stream corridor clean-up, introducing natural elements to the river, bank stabilization, preventing new streambank erosion, creating a natural channel design, and recovering biodiversity and function. The renaturation of this section of the Lana River will help to achieve revitalization as it will partially remedy pollution through physical removal and natural filtration by native flora. Likewise, we hope to achieve an increase in biodiversity and social activity at the river as creatures and people rediscover it as inviting green space.

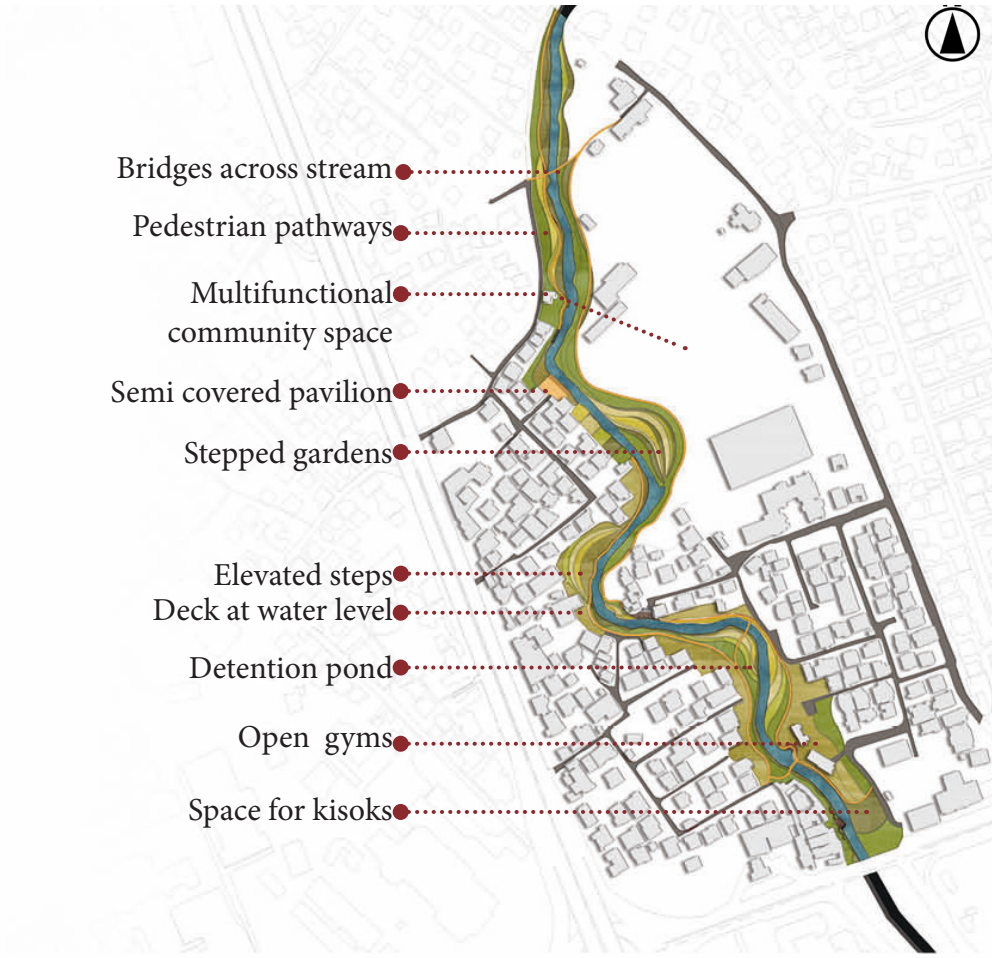


Fig. 32: Master plan for riverfront development (Base map: Asig Geoportal, 2021)

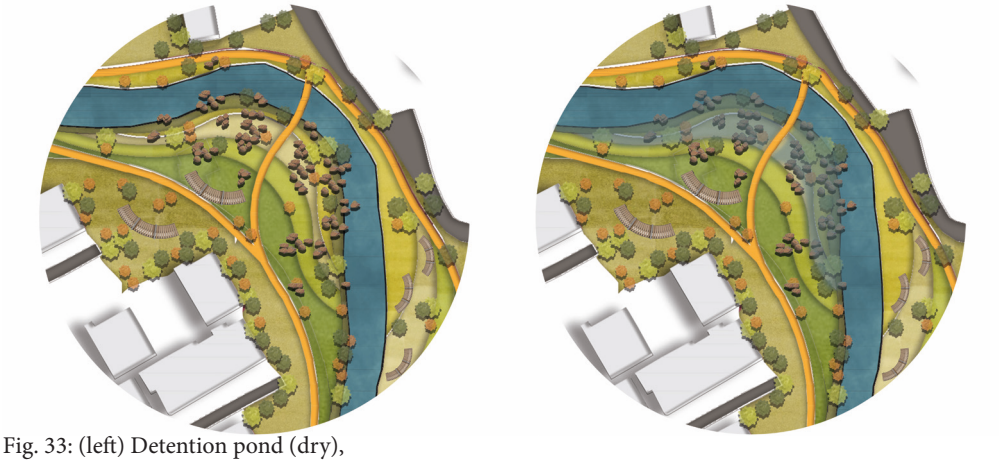


Fig. 33: (left) Detention pond (dry),
(right) Detention pond submerged during a 100-year flood

Once the basic cleanup of the water body and its banks are done, the next phase of our intervention is to provide design proposals for riverfront development in the area. As part of our vision, we considered improving accessibility by introducing pathways and overhanging decks for pedestrian use. Similarly, the allocation of spaces for small shops and a larger semi-open recreational pavilion will inspire a positive social atmosphere. Most importantly, our intervention aims to retain and protect all existing built structures in the study area, by utilizing large detention and infiltration basins.

In the next intervention phase, a "network" of micro public spaces is proposed. This network ensures the existence of a decentralized and accessible public space for all the inhabitants of the place and will create a connection to the river. These areas can be recreation, meeting centers, or simply vegetation containers. A visual analysis of possible accessible areas within was first carried out to generate a network of nine potential spaces as seen in Figure 47. Complementing both aspects of revitalization, the creation of a micro-public space network aids in stormwater infiltration and groundwater recharge, as well as encourages positive interactions between neighbors through the provision of green space.

During the intervention stage, Stage 3, locals will have the option to vote and collaborate on specific options within the public space design.

Finally, Stage 4 occurs post-construction when we again directly address the public with interviews, surveys, and questionnaires to understand their experience and changes in attitude and behavior. Through this, we hope to gauge how well the project was accepted by the public.

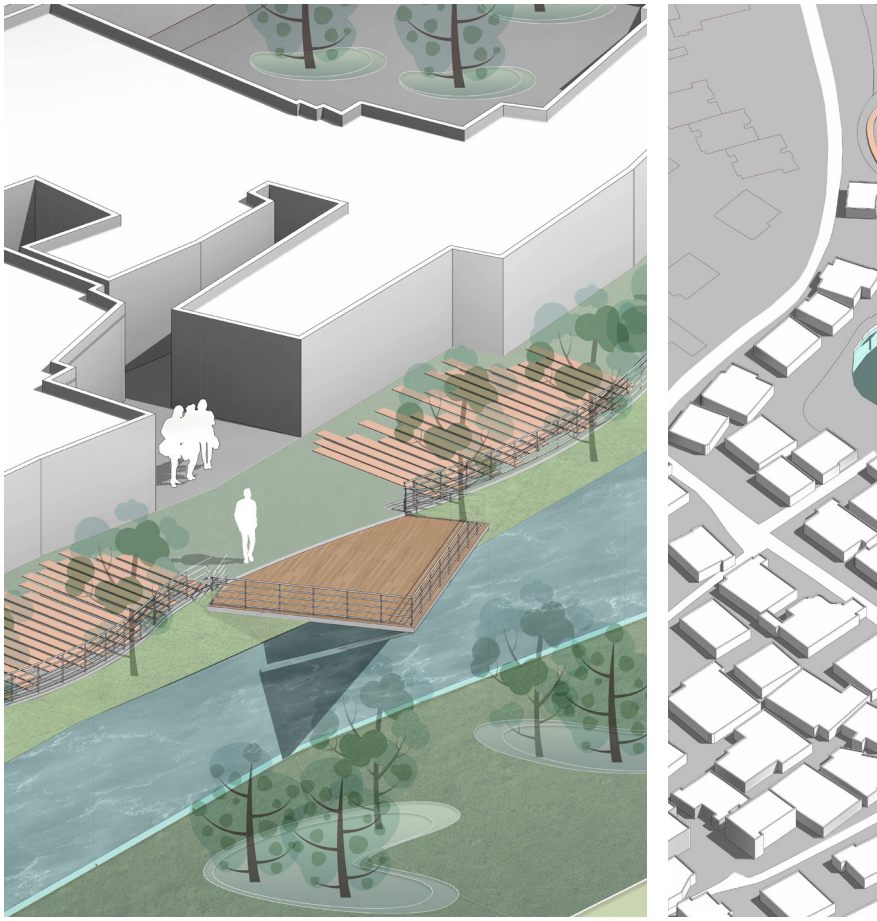


Figure 34: Overhanging pedestrian decks

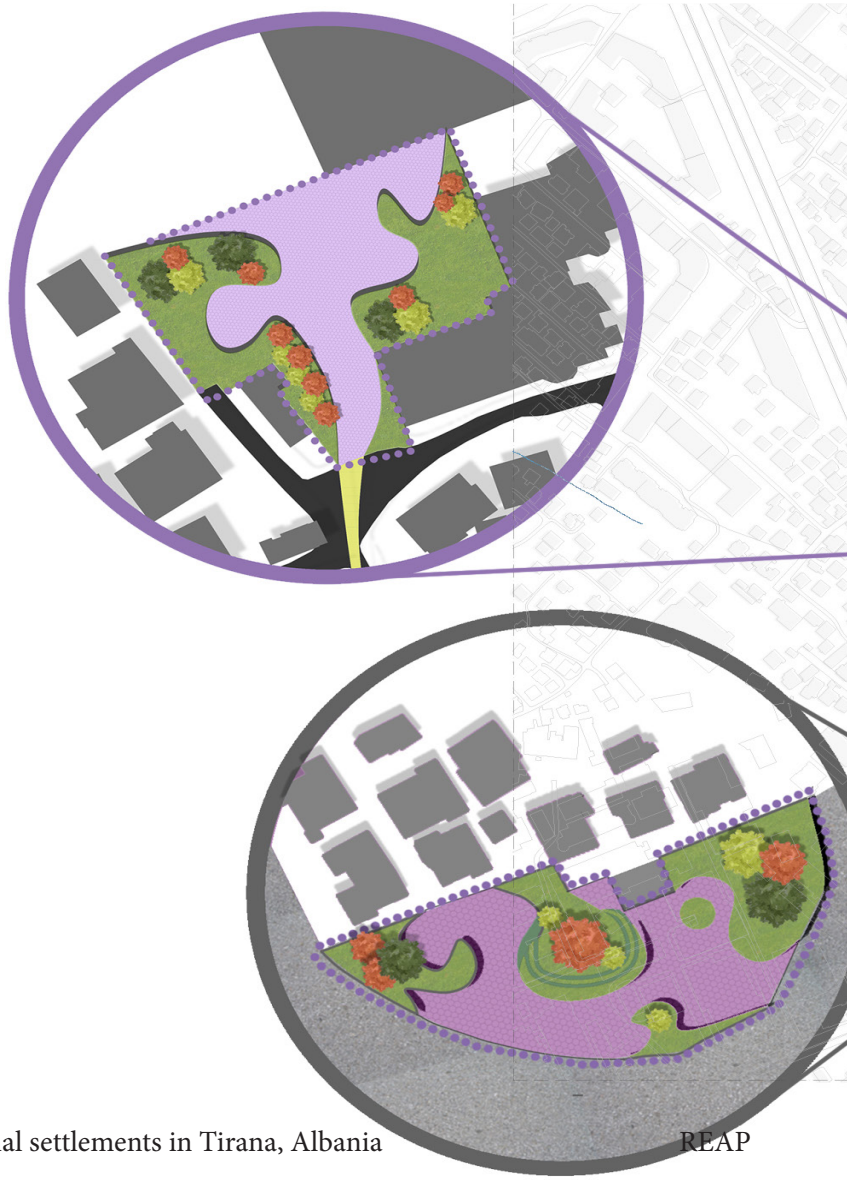


Fig. 35: Community pavilion area

Fig. 36: Design guide ofpotential areas. (Base map: Asig Geoportal, 2021)

Funding and Monitoring

Monitoring and evaluation will occur in 3 stages. During the first stage, the conservancy board will develop metrics for success as well as a working group of members and volunteers. During the second stage, the process is delineated. Monitoring will track metrics such as the number of visitors, amount of litter, and the appearance and smell of the water. The monitoring data will be assessed against our goals for decreased illegal waste disposal, increased social cohesion, and better water quality in the study area.

Conclusion

Recognizing the area's social issues and the inadequacies of Tirana's municipal government in supporting the water sector, our project approaches river revitalization from the bottom-up, emphasizing community engagement and collaboration. Ultimately, we hope that through the construction of the Blue-Green Corridor on the Lana, and the utilization of its public participation model, the study area will experience an elevated sense of social cohesion, which will translate into positive change in waste disposal habits and better river water quality.

By including the public through communication, education, and collaboration, Blue-Green Corridor on the Lana will promote a shift in behavior among the residents. Through the process of educating the public and working with them to develop specific aspects of the intervention designs, the project will instill a sense of pride and responsibility within the population.

Energy

Power Above, Recreation Below

Group 6

Motivation and Relevance

Albania has maintained a steady economic growth and an ambitious agenda of reforms of its institutions and aspects of governance working towards further democratization, more effectiveness, and compliance with European Union (EU) accession criteria (Xhindi, 2013). Energy supply has been improved significantly in Albania and yet further efforts will be needed to achieve some of the SDG. One of the major developmental challenges Albania has identified relates to a lack of sustainable cities and communities, poor infrastructure, and prevailing informality. Albania, in the last two decades, was faced with an uncontrolled phenomenon of internal migration. The presence of the multi-form buildings disorderly settled next to the main urban centers is obvious. The character of these settlements is composed of dissonant building volumes, consisting of houses self-built in different materials such as wood, masonry, or frame structures in concrete. The key drivers of the formation of illegal settlements in Albania were poverty and social exclusion. These dwellings represent social inequality which obstacles sustainable urban development (Osmani & Yunitsyna, 2019). This situation is exacerbated by the transitional economic decline and the internal demographic and political changes which have left a considerable share of citizens neglected, while development is concentrated in city centers. Informality has gained government attention mostly in early 2000 with scattered attempts and experiments in earlier years.

Problem Identification

Albania and the city of Tirana experience momentous problems of social disparity while facing the effects of climate change. Effects such as heatwaves, droughts, and water scarcity put stress on the national energy supply which is heavily dependent on hydropower from the Albanian Alps. Such events could trigger supply shortages and increase electricity prices putting financial pressure on low-income households. Instead of aiming for short-term energy supply solutions such as importing fossil fuels to bridge the supply gap which furthers the exploitation of finite resources, creating emissions, and accelerating climate change other solutions are required. To address this disparity, an informal settlement area in west Tirana was chosen to research a possible local solution to this problem.

"How could the abandoned greenhouse become a hub for energy production to diversify the electricity mix of Tirana?"

Methodology

This research relies on a review of the literature available on renewable energy sources and local development strategies as well as an analytical review of and comparative approach in the three case studies about sustainable energy production ensuring adequate quality through interviews and quantitative relevance through data collection. It evaluates the current situation of an informal settlement in Tirana Albania and thereby develops an intervention to tackle issues needed to achieve a more sustainable and diversified electricity mix, generate green open, and accessible public space for the public while creating community space. To elaborate on the data, this study focuses on the following two leading research questions:

How could the abandoned greenhouse become a hub for energy production to diversify the electricity mix of Tirana?

How could such a transformed space empower the local community by creating common space and recreational activities?

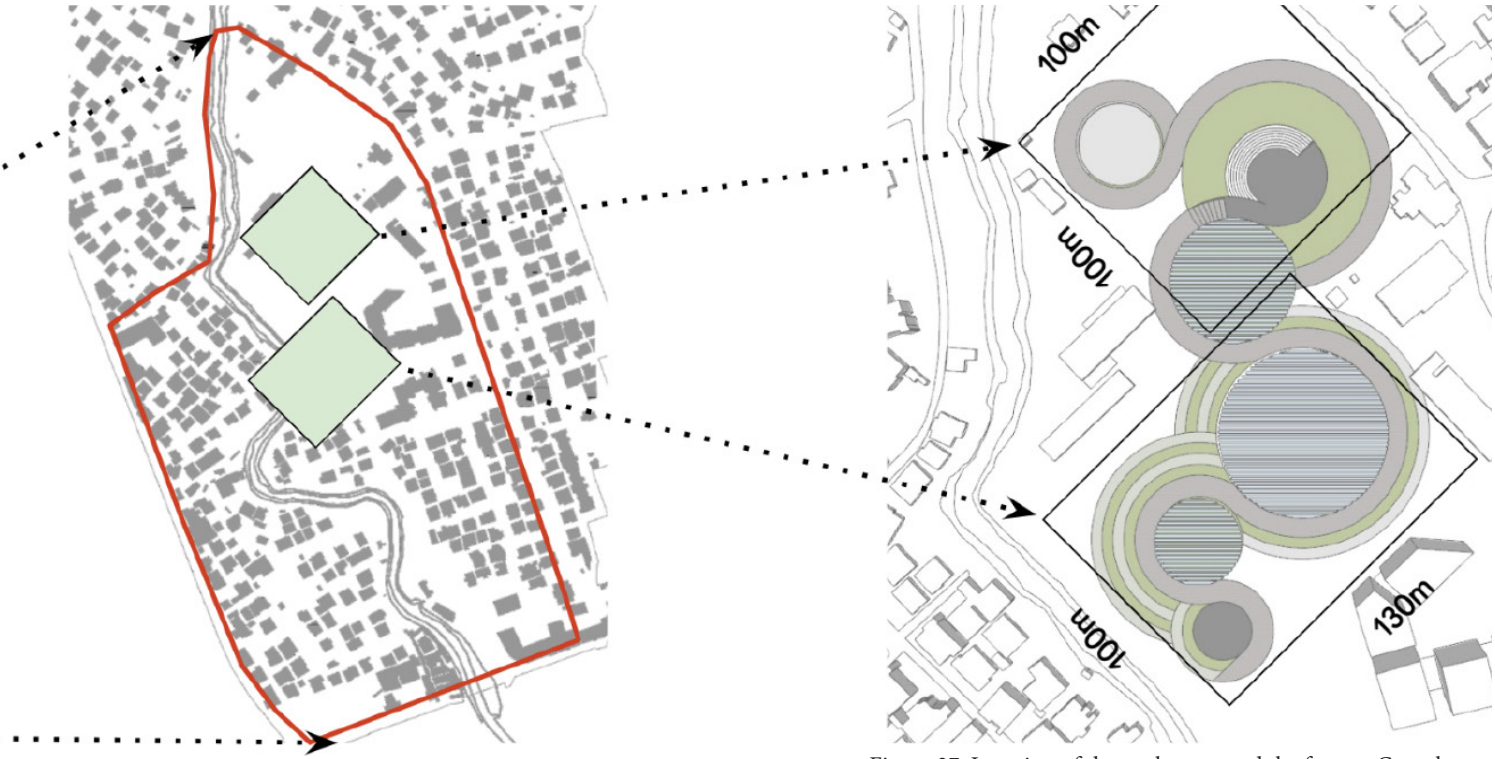


Figure 37: Location of the settlement and the former Greenhouse
(Base map: Asig Geoportal, 2021)

Concept Development

As a result of the findings, the study focuses on the diversification of electricity supply and injecting the produced green energy into the electricity grid of Tirana. The location of such intervention is decided to be the former greenhouse field which is shown in the following map. After the analysis of the energy-related issues in the informal settlement as the focused area, the study recognized the need to improve both the energy mix as well as the urban sustainability situation in the area.

Power Above: Solar PV Electricity

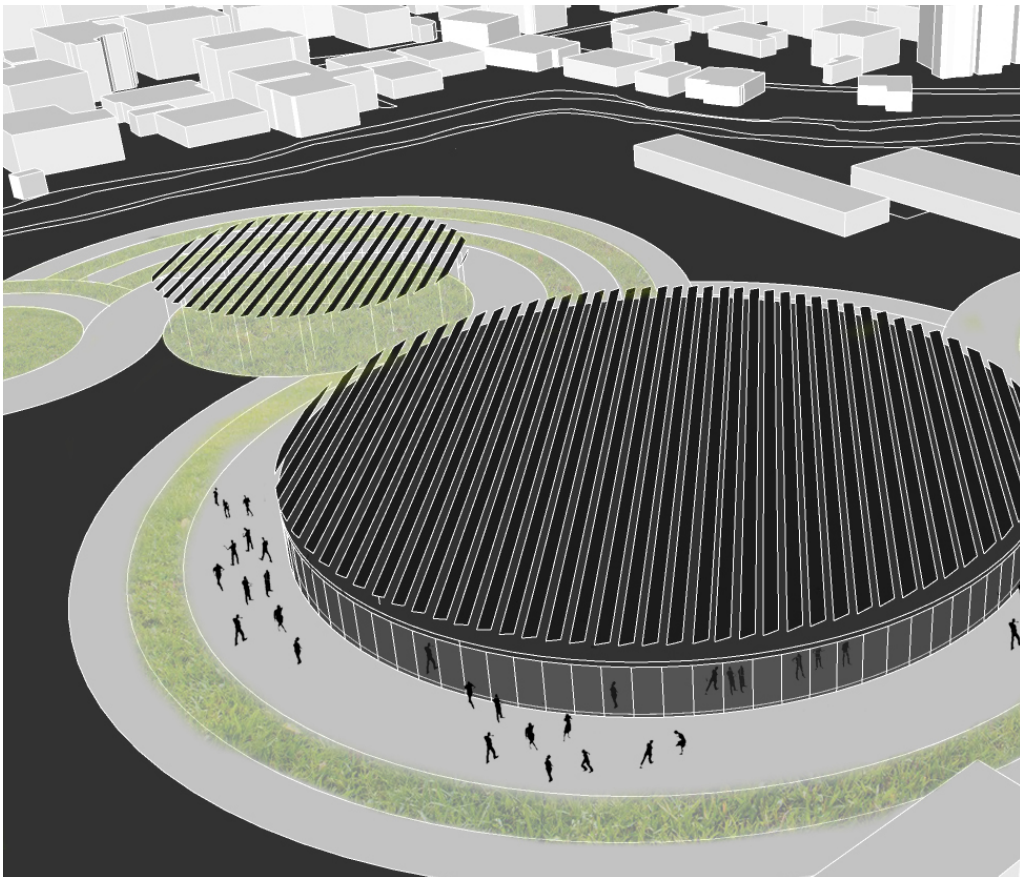
The concept of "Power Above, Recreation Below" is introduced as a multifunctional and mixed-use space. Designed within the borders of the Greenhouse abandoned area, divided into two rectangular fields with dimensions of 10,000 sqm (the upper field), and 13,000 sq m (the lower field), a total of 23,000 sq m of open space (Figure 49).

Based on literature and calculations, the electricity demand of one household (with 3 to 4 members) in the settlement is calculated as 5,382 kWh/y. In total, the electricity demand of the whole settlement is 3.14 GWh/y for the populations of 1,990 residents, around 585 households, and about 250 residential buildings.

The PV system is divided into three circular fields as part of the recreational landscape in the Greenhouse. The smallest will produce 210,000 kWh/y, the medium-sized field 228,000 kWh/y, the largest will produce 438,000.

The PV*SOL software shows that placing a Solar PV system in the Greenhouse area will produce 876,000 kWh/y of electricity. Through such renewable energy provision, an average of 411,583 kg/year of CO_2 could be avoided (PV*SOL, 2021). The total PV surface is 3,500 sqm, which includes only 30-35% of the Greenhouse land size.

The PV system includes 2,029 modules, each with dimensions of 1.016 mm width, 1.686 mm length, 40 mm thickness, and 18 kg weight. With a PV surface of 3,476.6 sqm, orientation to the south 180° and 15° tilted (PV*SOL, 2021). All to ensure the highest efficiency possible for each module, and to decrease the shading to the minimum. The modules are placed at 6 meters in height to take advantage of the land underneath. And to be more specific, covering only 3,476.6 sqm of the Greenhouse area is almost as 30-35% of the space. This generated electricity can be equivalent to 163 household needs of electricity.



The electricity generated will be fed into the grid directly. This decision is made because implementing a direct system giving the electricity directly to houses, requires the basic infrastructure that is complicated to make in such an informal settlement. Also, the analysis showed that in the case of direct transmission of electricity to the house, there is a need for storage batteries which causes extra cost and inefficiency issues. This electricity is especially helping the grid in summer times when the pressure on hydroelectric energy provision is higher.

Recreation Below: Greenhouse Location

Lack of recreational space was one of the main issues that the study came across from the initial stages of the study. Therefore once the energy scope was defined, the next step was to define the location of the possible intervention and the way it is designed and integrated into the landscape.

The abandoned greenhouse area as a field that has been unused for years, could now be designed to generate electricity and to create recreational space for the residents of the settlement. A recreational function has been an important factor during all stages of study, as the priority for such intervention is to improve sustainability in the area. Also as the interviews with the local community showed, there is a need for such an integrated space, a hybrid space with dual functions.

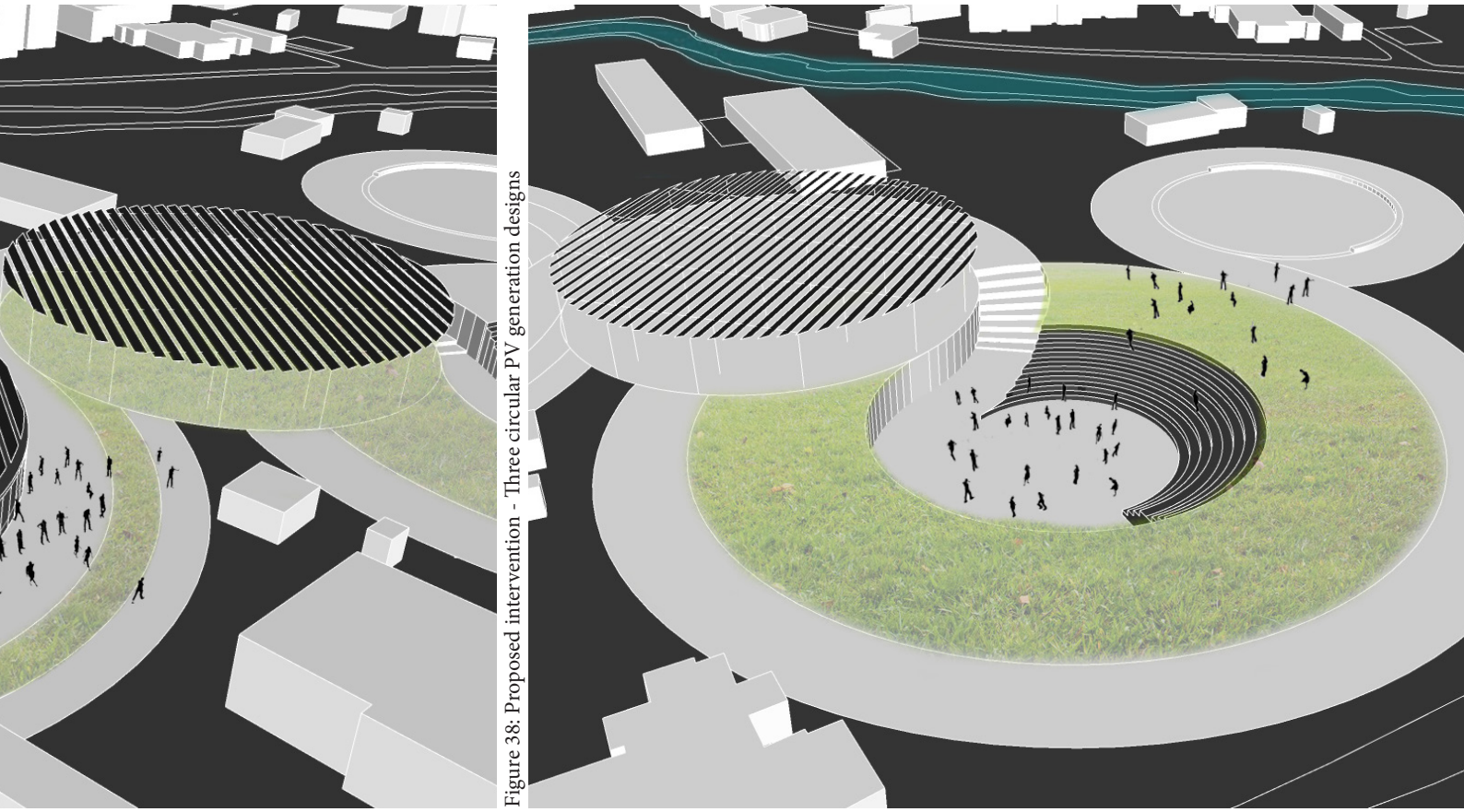


Figure 38: Proposed intervention - Three circular PV generation designs

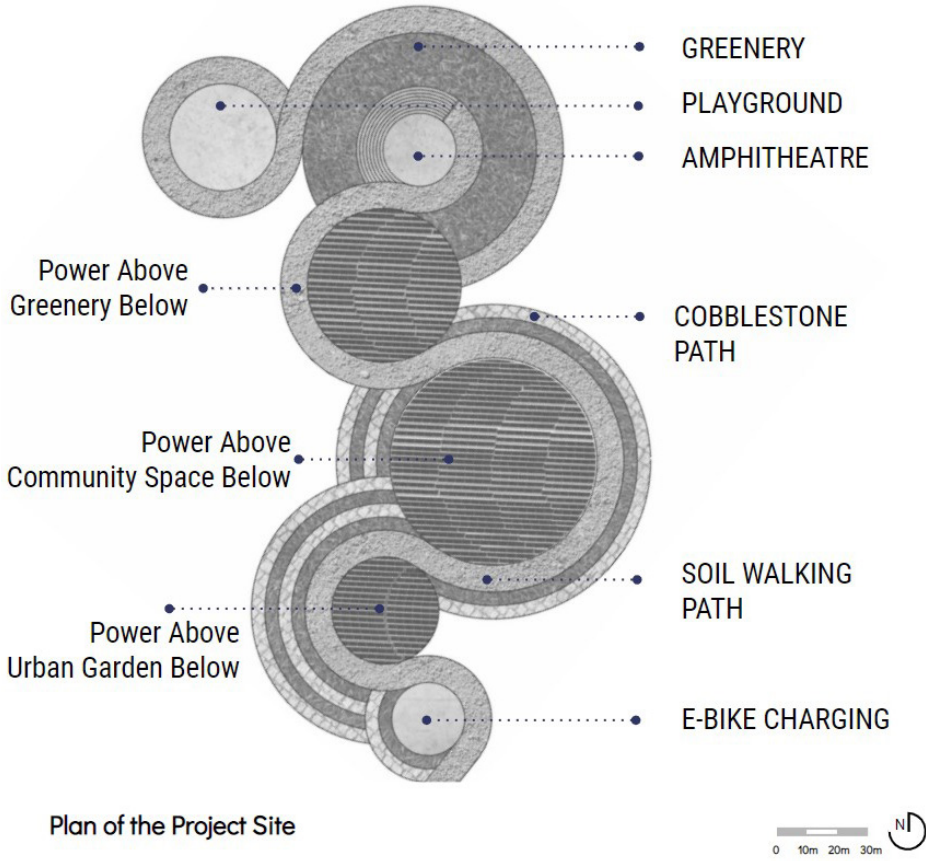


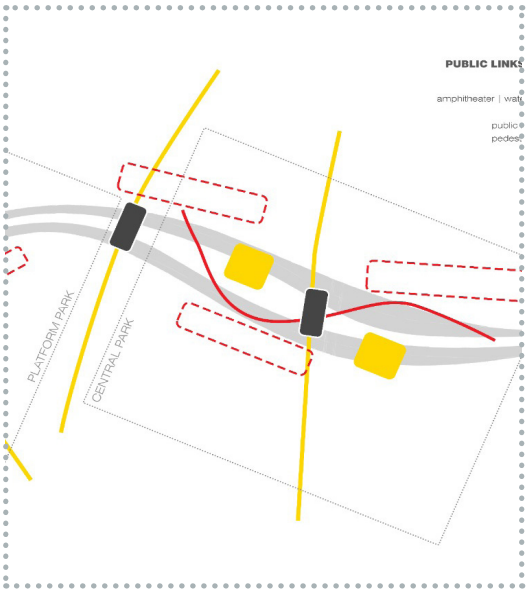
Figure 39: Proposed Plan of the Project Site

Conclusion

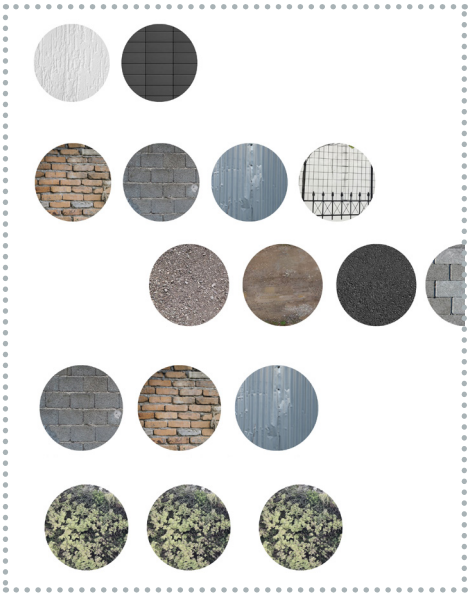
In summary, the proposal provides a comprehensive intervention that uses an unused area in the settlement and transforms it into an energy hub while at the same time utilizing it as a green public park for the citizens of Tirana. Such diversified electricity mix measures, powered by sustainable energy sources are the prerequisite for a climate-resilient city. Utilizing the potential of solar energy while combining it with green open and accessible public space yields the capacity to empower the local community and create space for recreation.

05 FAU Scopes

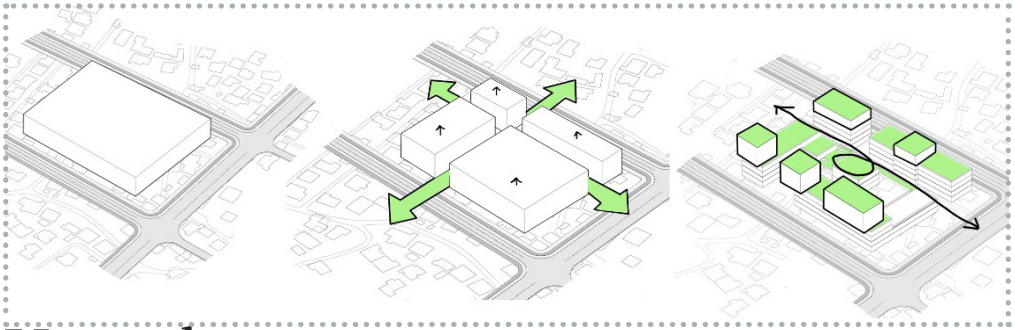
Public Spaces



Reuse



Upgrade



Urban Regeneration

Urban Regeneration

by Greis Golemi

Urban regeneration is the product of many interactions. It is both a need and a response to the possibilities that are present in a degraded and abandoned area at a certain place and moment. It cannot be claimed that all urban problems are the same in different residential centres or cities, or that those solved, tried, and laid out in the past have little relevance to today's circumstances, but it's the case to emphasize that every urban challenge aims and seeks to design and implement a specific response.

Urban regeneration is an integrated and comprehensive vision that dictates initiatives and actions that lead to the solution of urban problems. This process tends to bring sustainable and long-term improvements over time in terms of the economic, social, physical, and environmental conditions of the whole area, which is a subject for transformation.

It is based on a detailed analysis of an urban area. ith sustainable development goals, setting clear objectives with the best possible use of natural resources, economic, human, etc.

It is seen as an active activity involving the public, private, and community sectors. This is an activity that is likely to experience significant changes in its institutional structures over time. Another important element of urban regeneration theory has to do with the functioning of urban systems as a whole and the functioning of processes that are economic, social, physical, and environmental determinants of the content of urban regeneration.

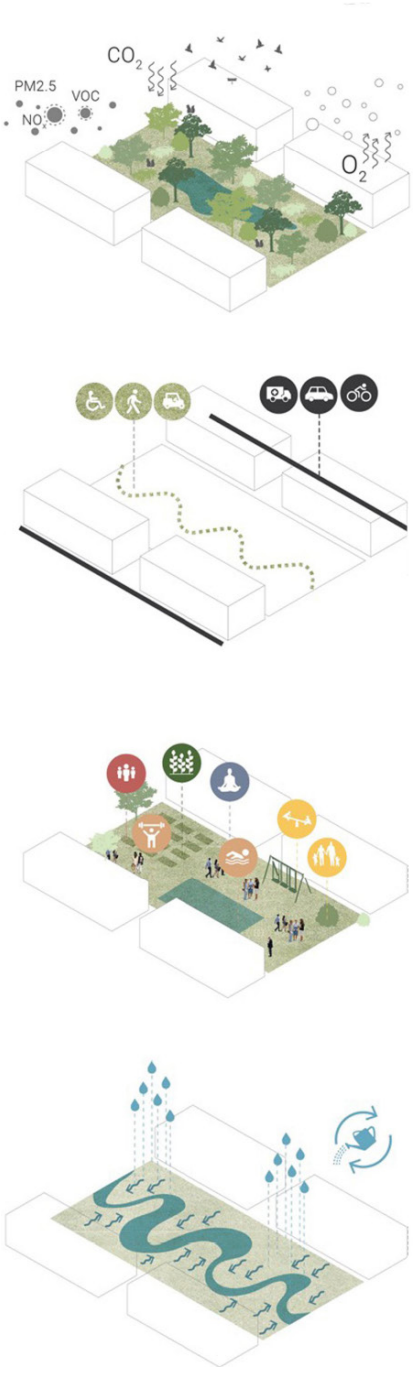


Figure 40: FAU Scope - Urban Regeneration

Upgrade

by Joana Qamo

Upgrade explores architectural and design concepts that seek to enhance and repurpose our surroundings. From slight changes to complete renovations, the spectrum of possibilities is vast. Extensions upon a rooftop. Factories turned into relaxing retreats. Wood additions contrast with antique brick exteriors. Upgrade provides vibrant exemplars and enthusiasm for revamping existing spaces.

Repurposing the unused; a dilapidated barn, a raddled townhome, a historical and fading building façade – these can all be starting points for stunning and inspiring homes. Upgrade displays transformations: be it sheds into playrooms, a garage to a guesthouse, or an alpine hut into a holiday getaway.

Upgrade offers projects that succeed in finding the balance between the traditional and the modern. Architects share their experiences, motivations, and approaches. Before-and-after photos illustrate the metamorphoses. This is for all who desire a new perspective, for those that prefer to preserve rather than to demolish. What are ruins to some become another's architectural playground.

We aim to including in the masterplan all these strategies in order to give the most sustainable solution to the neighbourhood by imporivng spatial quality within the proposed blocks, upgrading the area, strategies to improve air quality and lifestyle etc.

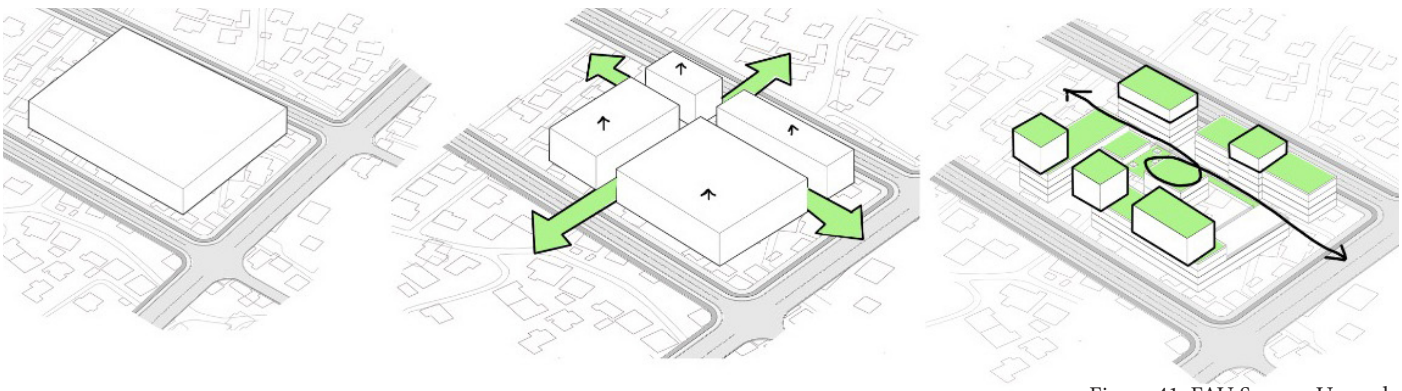


Figure 41: FAU Scope - Upgrade

Public Spaces

by Joana Qamo

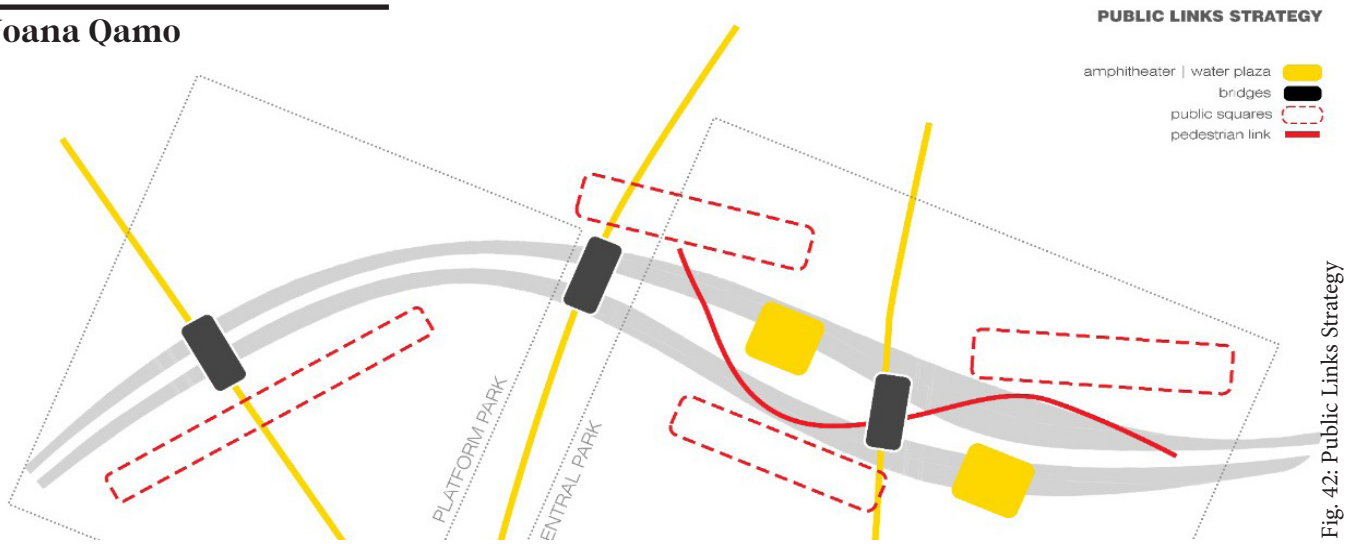


Fig. 42: Public Links Strategy

The continuing growth of urban populations has intensified the need for cities to provide conditions for a healthy and creative way of life, work, and leisure activities. Public spaces, which fill the urban gaps with life, are directly associated with the construction of what we call a city and influence the relationships that are created within them. Public areas shape community ties in neighborhoods. They are places of encounter and can facilitate political mobilization, stimulate actions, and help prevent crime. They are environments for interaction and exchange of ideas that impact the quality of the urban environment. A good public space is one that reflects diversity and encourages people to live together effortlessly, creating the necessary conditions for permanence, which invites people to be outside their house. It is the vitality of spaces that attracts people.

Well-designed public spaces work as an added value of the city and citizens in the social development achieved through participation in decision-making, cohesion, co-operation, and co-living. Public spaces, aim at involving the largest possible number of citizens. It reveals that such environments can bring new knowledge on the role of urban design in framing social cohesion. It demonstrates not only that these spaces are not necessarily dead, rigid, and unchangeable entities but also, and more importantly, that they are sociologically more open for a diversity of users, creating and sustaining new forms of social cohesion.

Designing a series of connected public spaces, we aim at building a safe environment, to revive the area by making it attractive for the people living in it and the visitors, for every visit to have a reason. Every step will follow the theme of connection, of functions, of materials, of social life and environmental awareness. We intend to achieve our goal by designing a series of differently shaped and organized public spaces, squares, platforms, stairs, paths, and bridges, that connect every urban cell of human life within the area, building a "breathing organism" that starts to live in this abandoned part of the city.

Reuse

by Greis Golemi

The three Rs of the earth – Reduce, Reuse, and Recycle. With the help of 3Rs we can reduce and reuse all the waste and materials like metal, plastic, paper and also recycle bulbs, tube lights, metals, etc.

Reuse is the action or practice or a rule of using something again, whether for its original purpose or to fulfill a different function. Designing a building to support adaptation, disassembly and reuse can reduce waste and extend its useful life, providing economic and environmental benefits for builders, owners, and occupants, and the communities. After analyzing the language of this area, we suggest implying different approaches regarding the strategies and the specific situations in each block, by working on public spaces and reusing materials from the demolished houses, adding modular buildings as a analogy with the development of the area, but under rules and architecture language, creating multistore social houses and connecting with the rest of the city, connecting with the riverside and creating recreative spaces for the inhabitants and most importantly giving the spaces to the community.

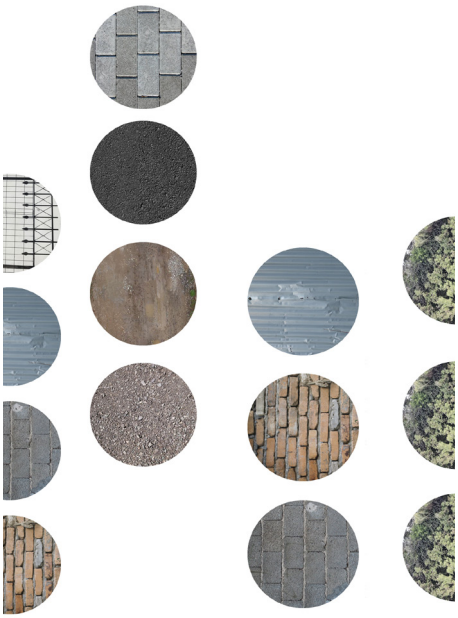


Figure 43: FAU Scope - Reuse

06 FAU Interventions

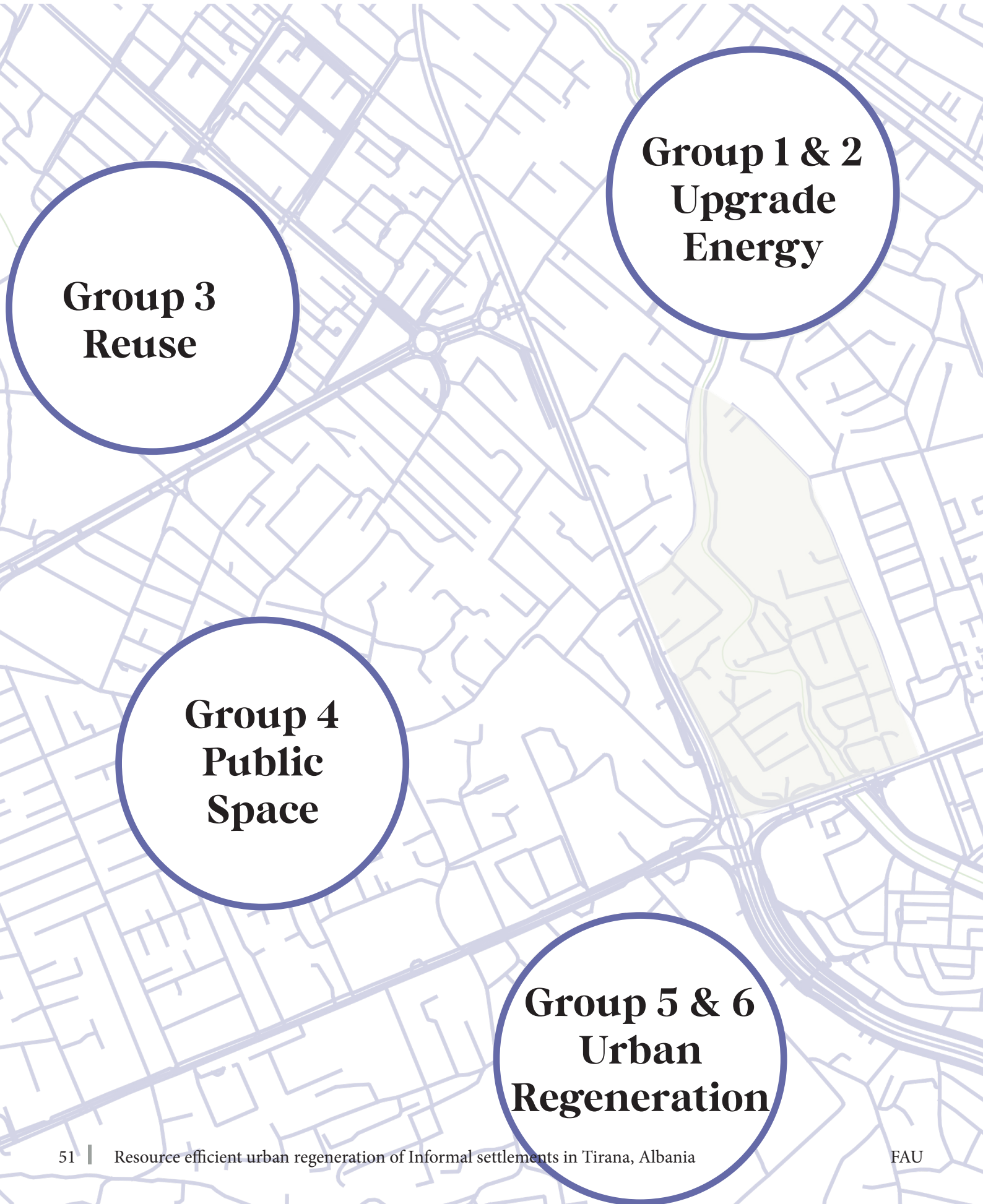


Figure 44: Site's Division in 8 different zones for interventions (Base map: Asig Geoportal, 2021)

1

Upgrade

Energy

The interventions which we decided to take place in this area aims to improve the social, economical, and cultural aspects of this community.

Local food market

The local market tries to help the economy of community grow by employing the youth and keep them away of the 'ghetto' life in these informal neighborhoods. Markets can, however, provide a structure and a regulatory framework that helps grow small businesses, preserve food safety, and make a more attractive destination for shoppers.

Parking Area

The Parking area is proposed as a support of the 2 previous buildings which would largely impact on the traffic and parking problems for the community. We also propose installing solar panels on top of the covering of the parking structure to gain solar energy which will be used later on to maintain the public electricity devices through the neighborhood. For example: street lights, recreational areas and parks along the main street.

Aero Museum

Tries to support the area which is previously known as the 'Aviation Field' by gaining the attention of tourists and albanians who show interest in the aeronautics' history of Albania.

Figure 45: Proposed Masterplan for Zone 3 (Base map: Asig Geoportal, 2021)

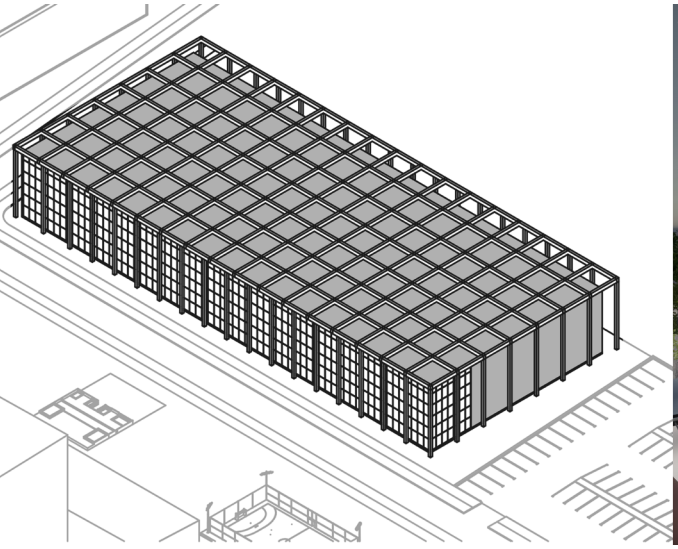


Figure 46: Local food market axonometric view

Figure 47: Local food market visualization

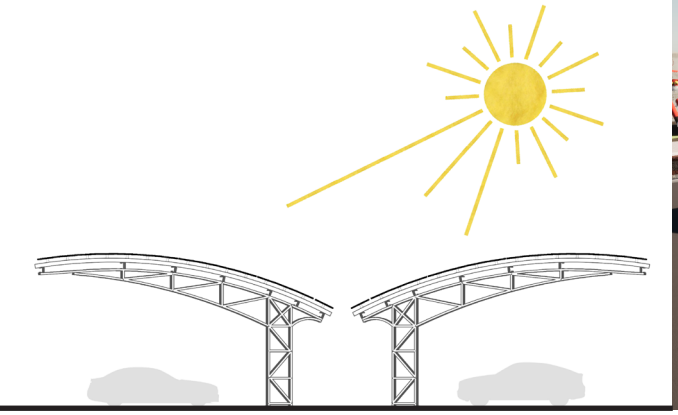


Figure 48: Parking area section

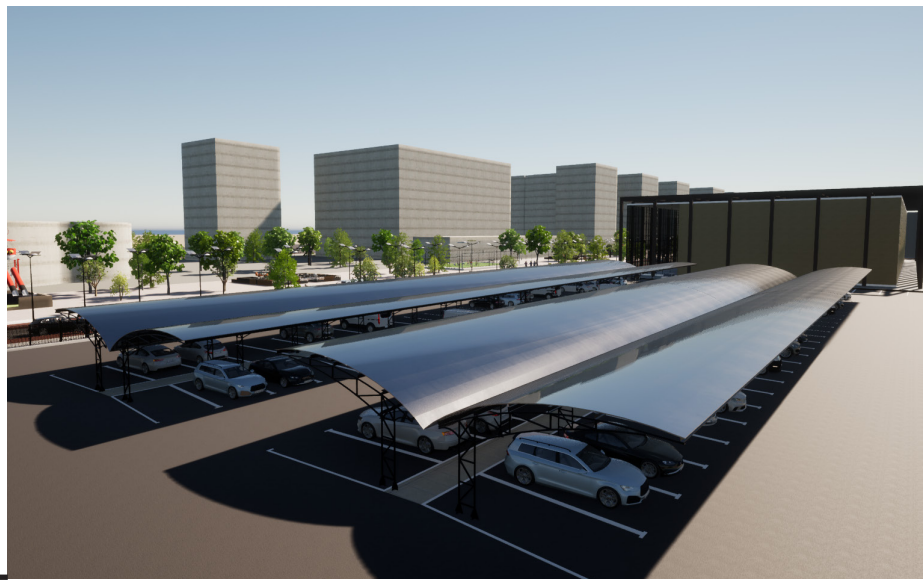


Figure 49: Parking area visualization

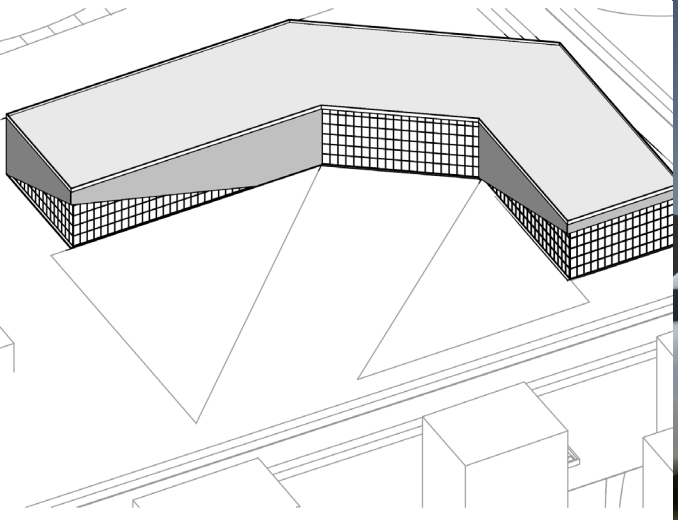


Figure 50: Albanian Aero Museum axonometric view

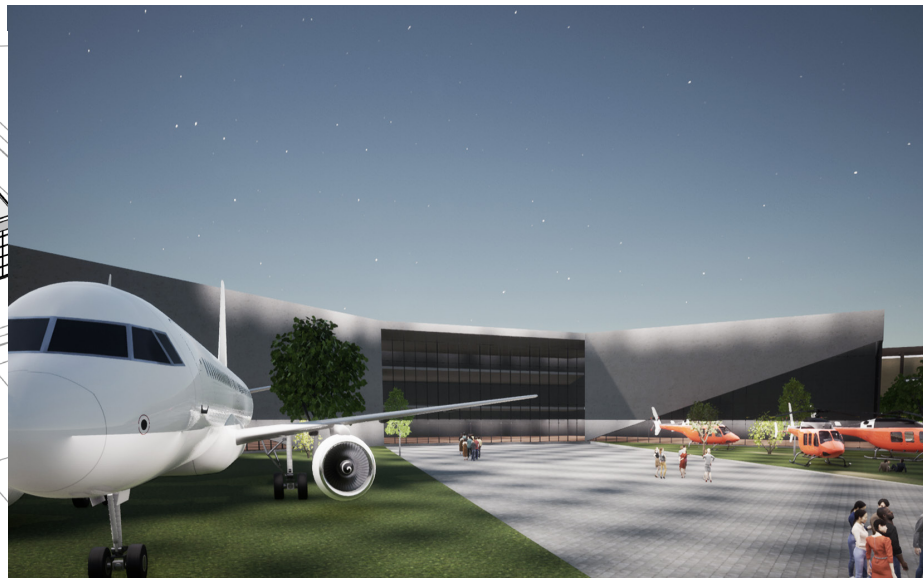


Figure 51: Albanian Aero Museumt visualization

1

Upgrade
Energy

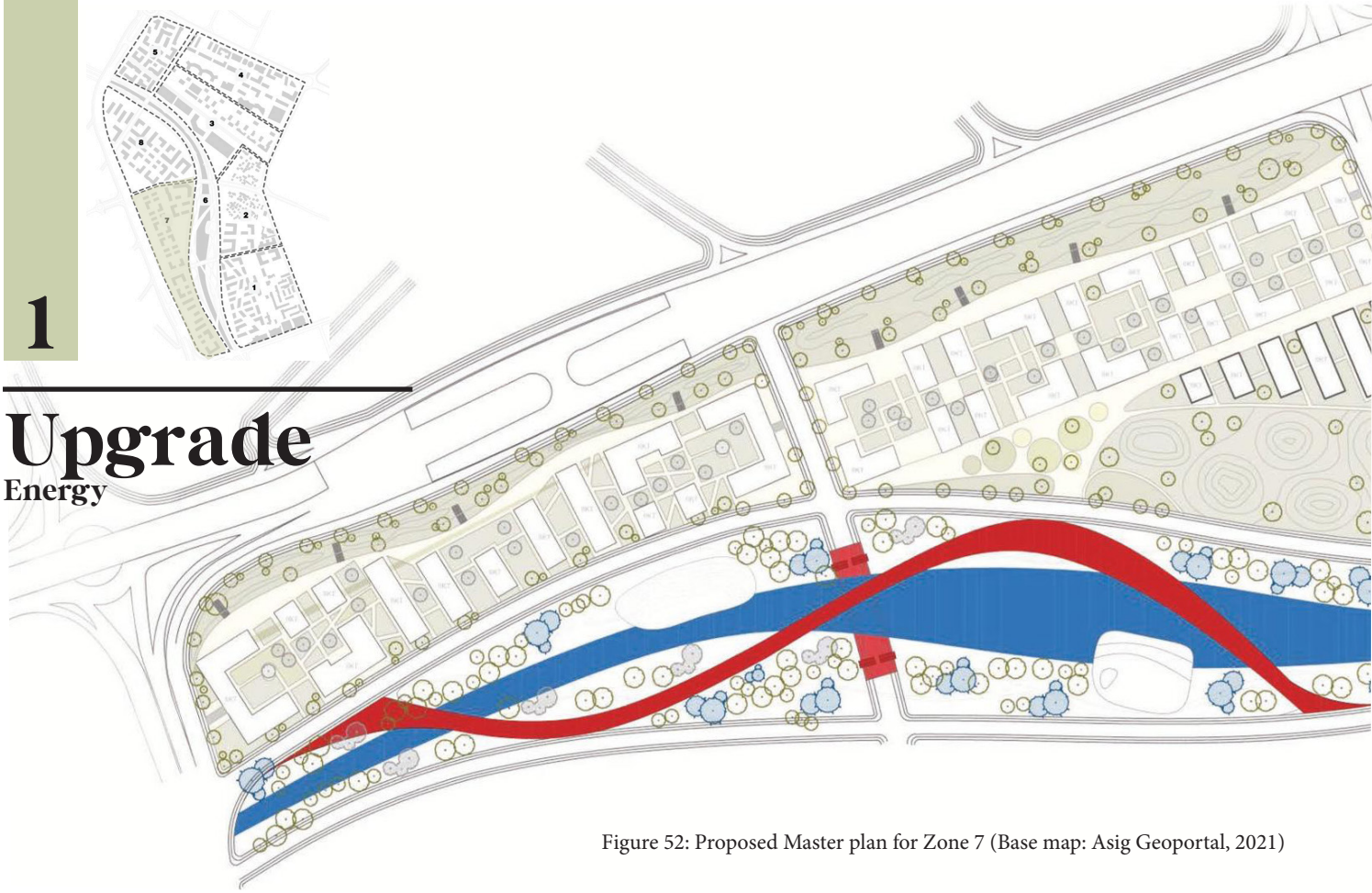


Figure 52: Proposed Master plan for Zone 7 (Base map: Asig Geoportal, 2021)

The masterplan provides a conceptual layout to guide future growth and development.This plan includes proposals for population,economy, transportation, and housing. Following all the strategies mentioned before our masterplan aims to improve spatial quality within the proposed blocks by keeping different distances regarding the PDV of Tirana.The upgrade the area will be done by adding new road infrastructure which will make accessibility easier in every type of movement. Other strategies are chosen to improve air quality and life quality by using photovoltaic panels and green terraces. As a result of this choices this will bring several benefits to the area not only on the economical part but wills also improve the social life quality, add value to the property, and add a new approach of designing.

Functional Diagram

The plan shows the location of various types of uses.The master plan is flexible enough to allow for change over time in housing diversity as communities mature. Regarding the municipality legislation our area should only be used as a residential area, with a very small percentage of institutions offices.As a result of this, the institution offices will be in the first block to be more easily accesed by the community.Then in order to respond the community needs, there are different functions added mostly on the ground floor of the residental buildings, which include: restaurants, shops, cafeteria, gym,etc. Commercial areas are planned within other areas to promote mixed-use neighborhoods, which are vibrant at all hours of the day. Entertainment and retail land uses are also integrated in the master plan.

Upgradind the neighbourhood

The vision of the project is upgrading the standard of life by giving the area a unique character, not seen in Tirana so far. Turning the neighbourhood into a smart one.

Green strategy:

Barrier made of artificial hill with trees to reduce contact with the main street called “Teodor Keko” in order to improve the air quality index and accoustic pollution.

Reorganizing buildings in order to respect distances between them, with the property border according to the manual data and the PDV of Tirana.

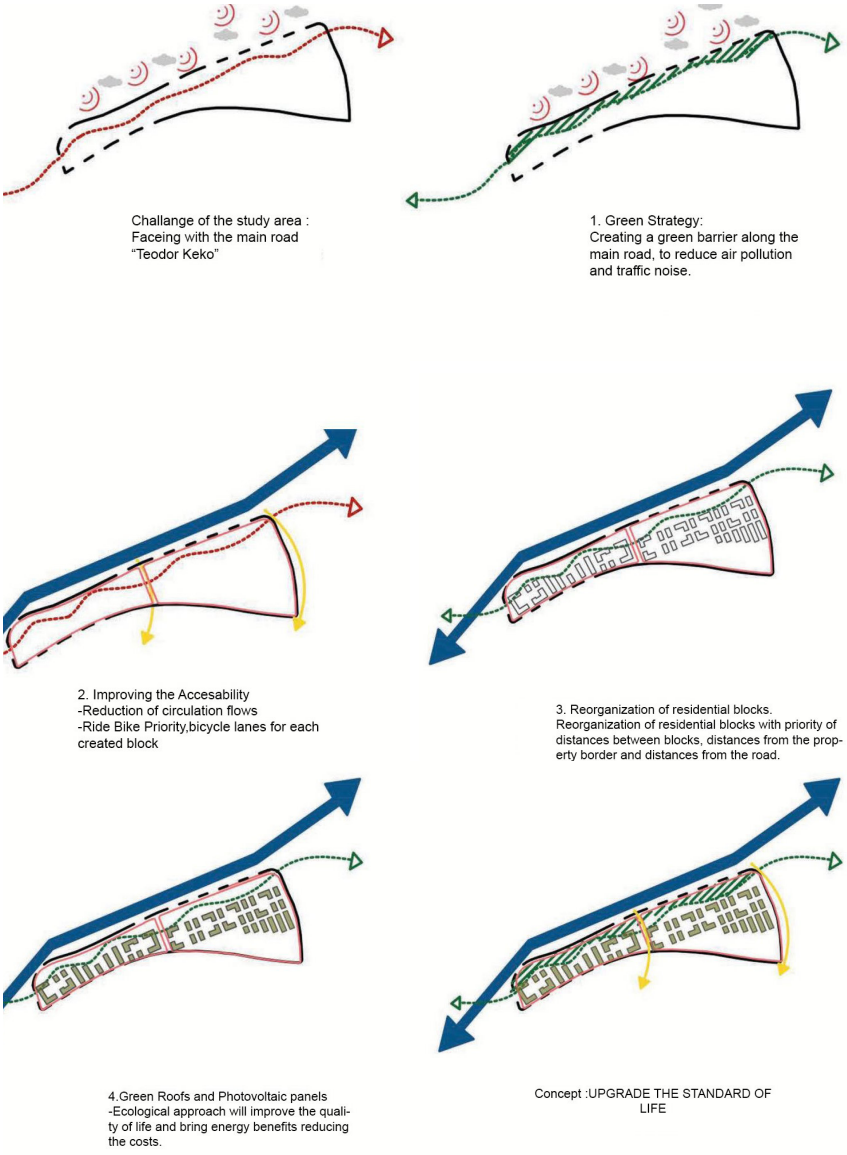
Green Roof and PV:

Ecological approach will improve the quality of life and bring energy benefits reducing the costs.

Improving accesibility: Interventions in the accesibility by adding bicycle lanes, proposing wider pavements and roads, with high standards.

Figure 53: Concept - Visualization

Figure 54: Concept - Upgrading the standard of living



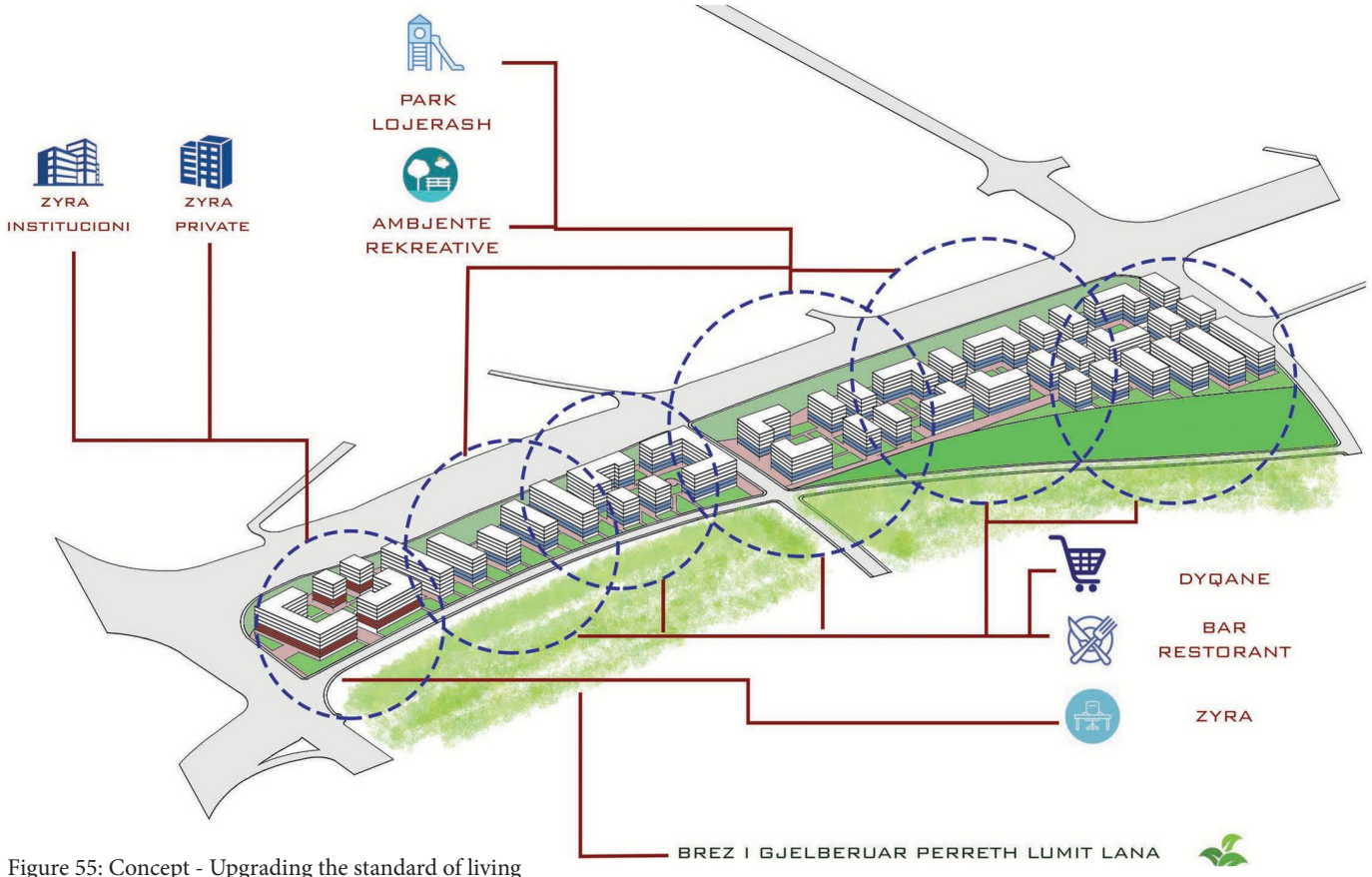
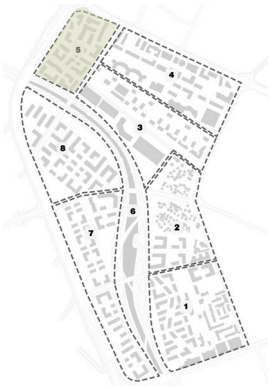


Figure 55: Concept - Upgrading the standard of living



2

Upgrade
Energy

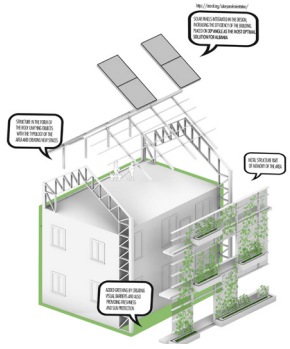
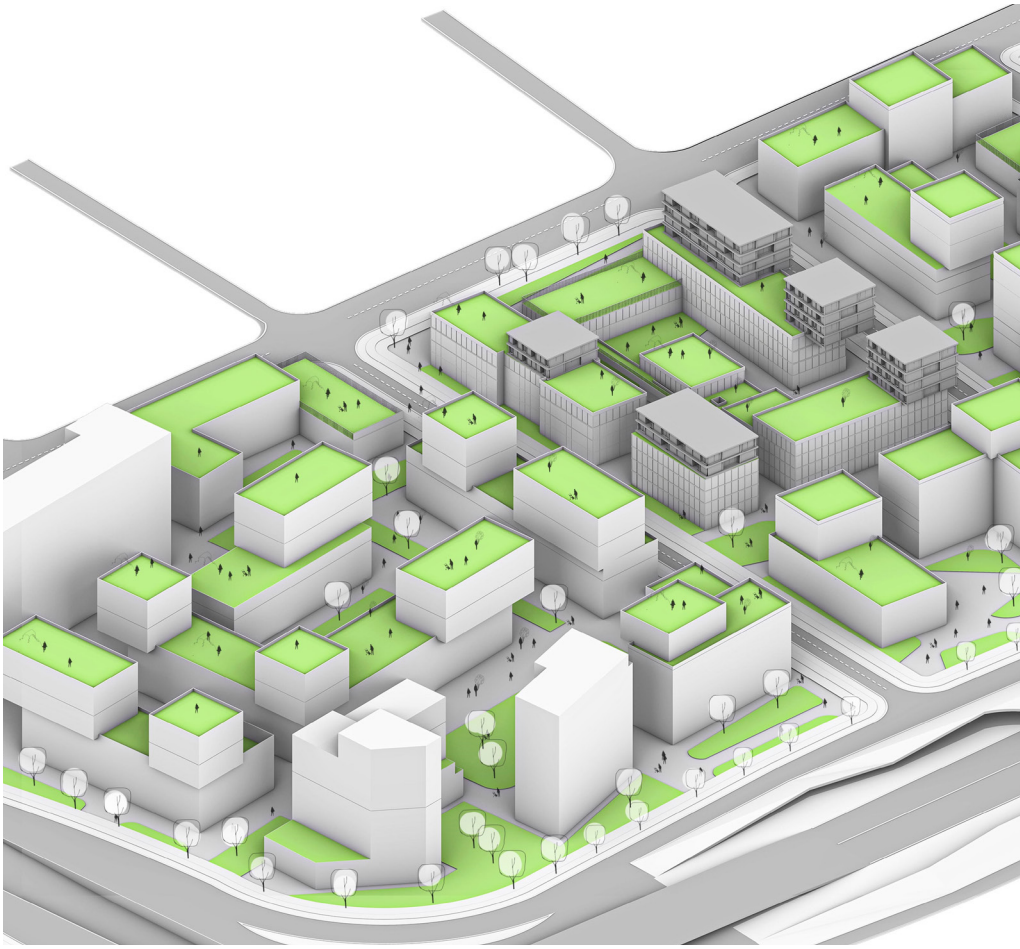


Figure 56: Typical Green facade



The concept is developed based on 3 main steps that consist of maximum land use, creation of public spaces, and implementation of green terraces which mimic the private yards of existing houses. The first change that has been implemented is in the road system. 3 new secondary urban roads divide the area into 3 subzones.

The proposed roads come as extensions of existing roads which are located east of the area. Development in this area must meet the criteria of a utilization coefficient of 45%, construction intensity of 2.4 with a maximum height of 26 m. Based on these urban parameters as well as the 3 design steps mentioned above, the residential block is proposed.

For the design of the block, which is a basic module 16mx16m, it has been taken into account to maintain the necessary distances between objects to create the necessary spaces for roads, parks, and emergency entrances. The distribution of the block in the whole area is done based on two principles, that of maintaining a distance of 3m from the border of the parcel (Rregullore E Planit Të Përgjithshëm Vendor) and a distance of 19 m from the main urban road St "Teodor Keko". The whole area is kept green and serves to create a visual distance from the road which serves as a barrier that improves the air and acoustic noise coming from the main road. For future phases, it is also considered to integrate metal structures with solar panels which will be implemented in the facilities, adding ecological values and giving efficiency to the facility.

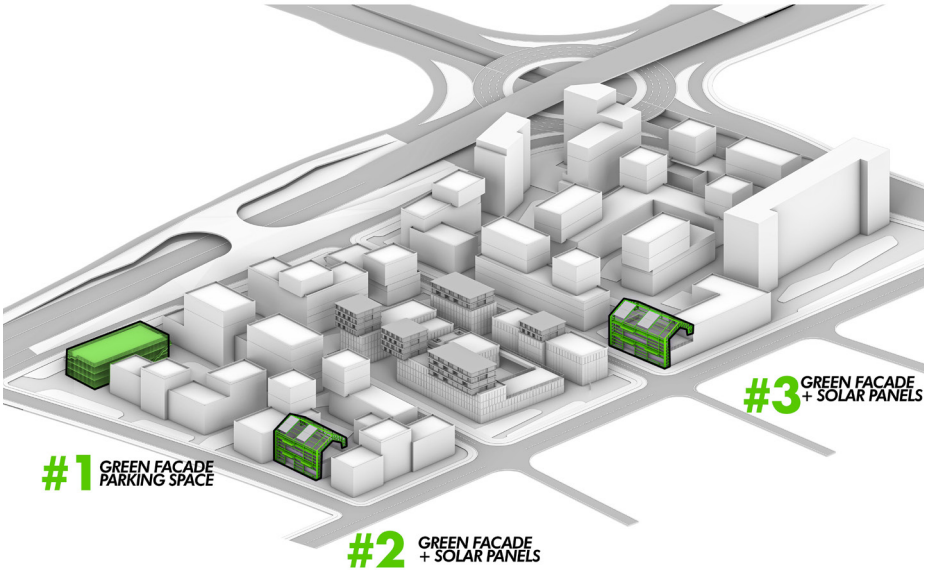


Figure 57: The conceptual volume of the proposed project

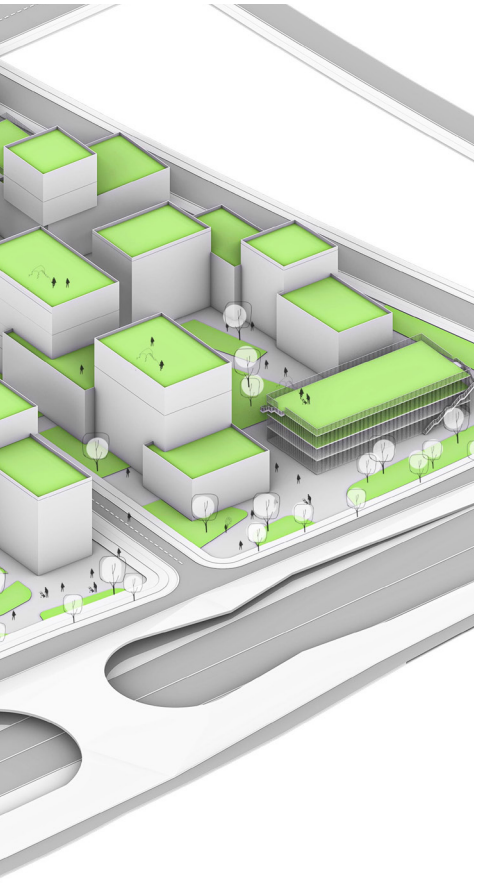


Figure 58: 3D Masterplan for Zone 5

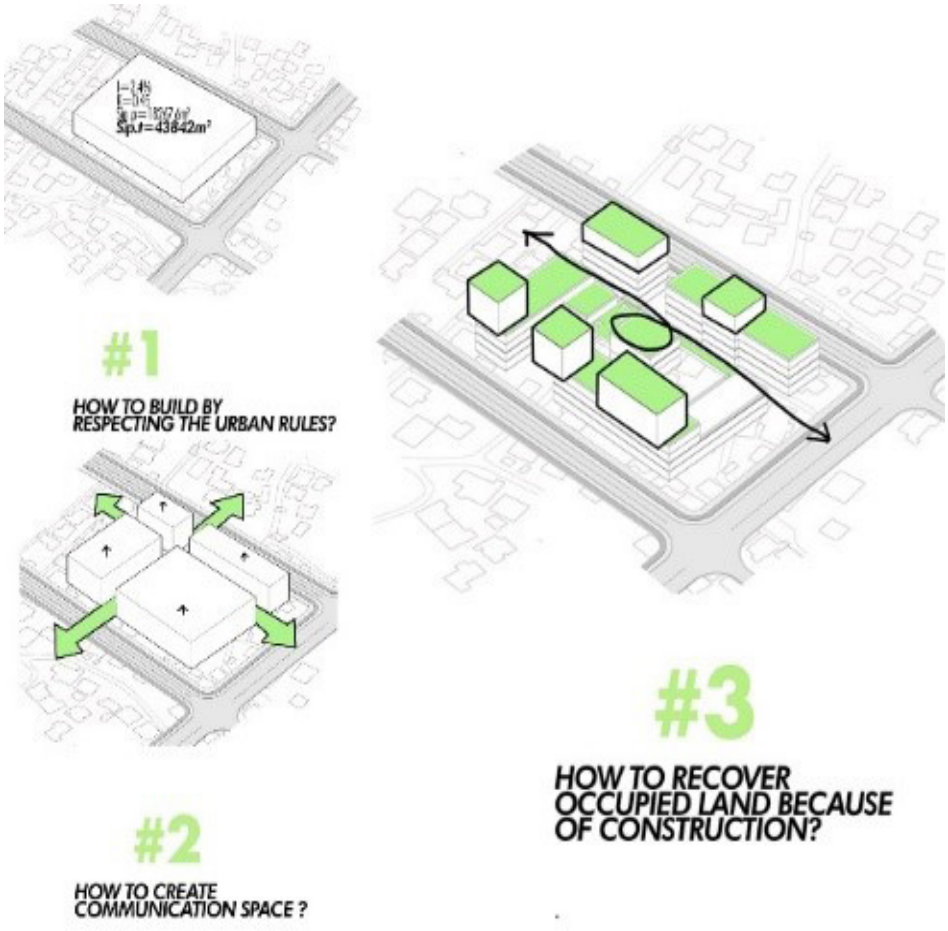
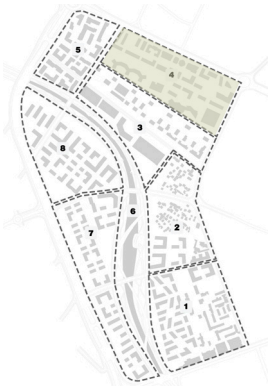


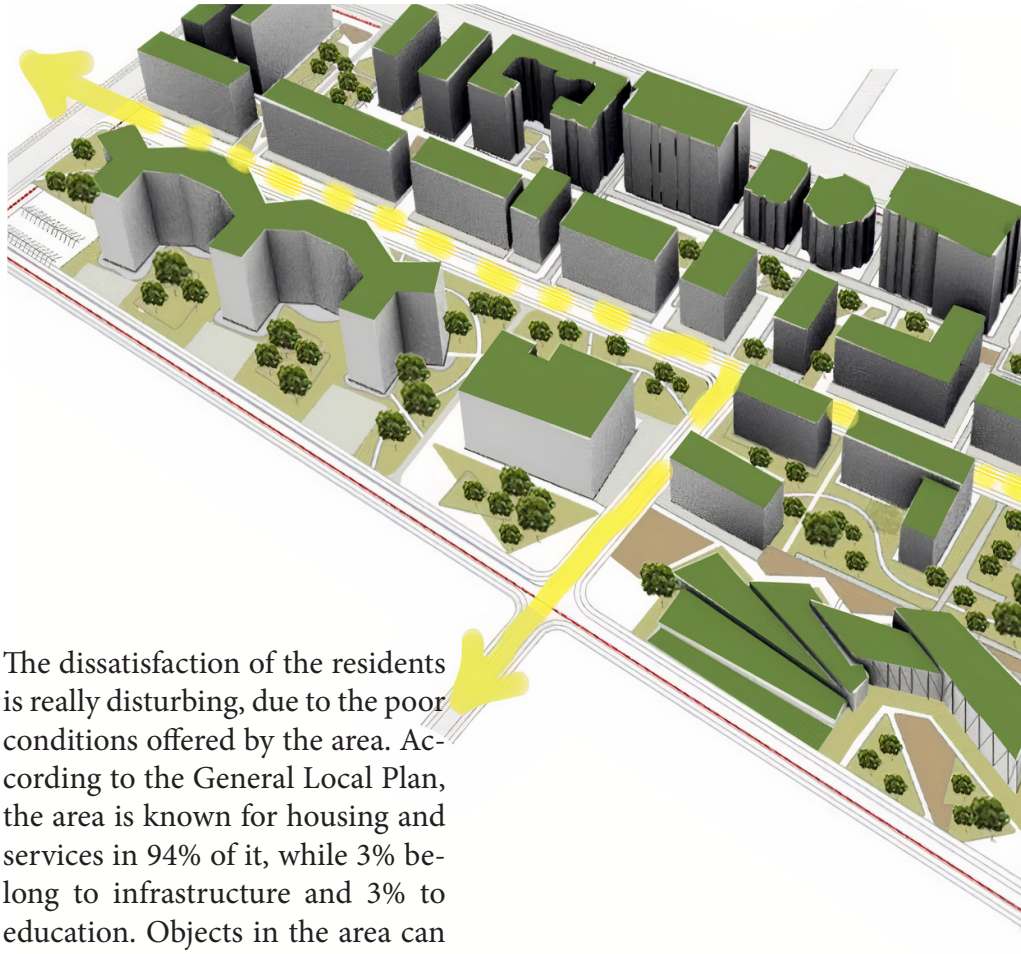
Figure 59: Concept

Figure 60: Masterplan for Zone 5 (Base map: Asig Geoportal, 2021)



2

Upgrade
Energy



Analysis

The study area has undergone a transformation due to change in governments but also migratory movements over the last three decades. The land was mostly occupied without any criteria and hence construction became informal. This also led to the neglection of areas, such as exisitng greenhouses or agricultural land that underwent change of land use.
The change in the area started initially with the New Ring project, which brought the way of organization, extension and distribution in the area of infrastructure and buildings. The plan consisted of designing the expansion of the two main urban roads and the new secondary urban roads, which make a better distribution of the whole area. The New Ring project increases the importance of the study area by seeing it as a strategic point which needs improvement.

The dissatisfaction of the residents is really disturbing, due to the poor conditions offered by the area. According to the General Local Plan, the area is known for housing and services in 94% of it, while 3% belong to infrastructure and 3% to education. Objects in the area can go up to 9 floors and 29m high. The intensity of construction is 3% and the coefficient of land use is 45%.

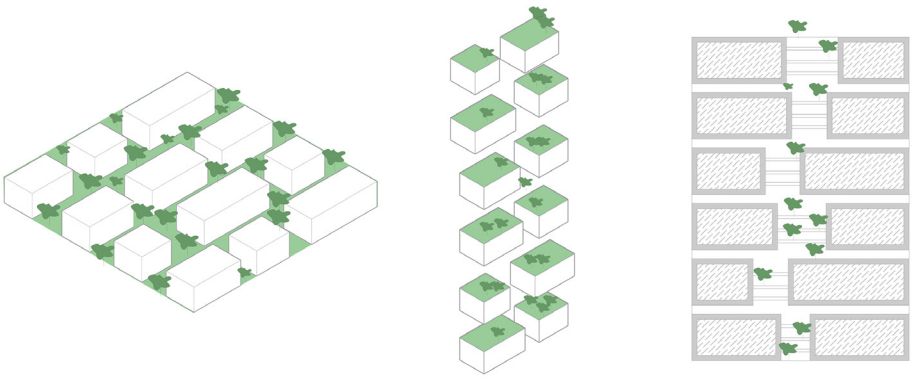


Figure 62: Building Concept
FAU

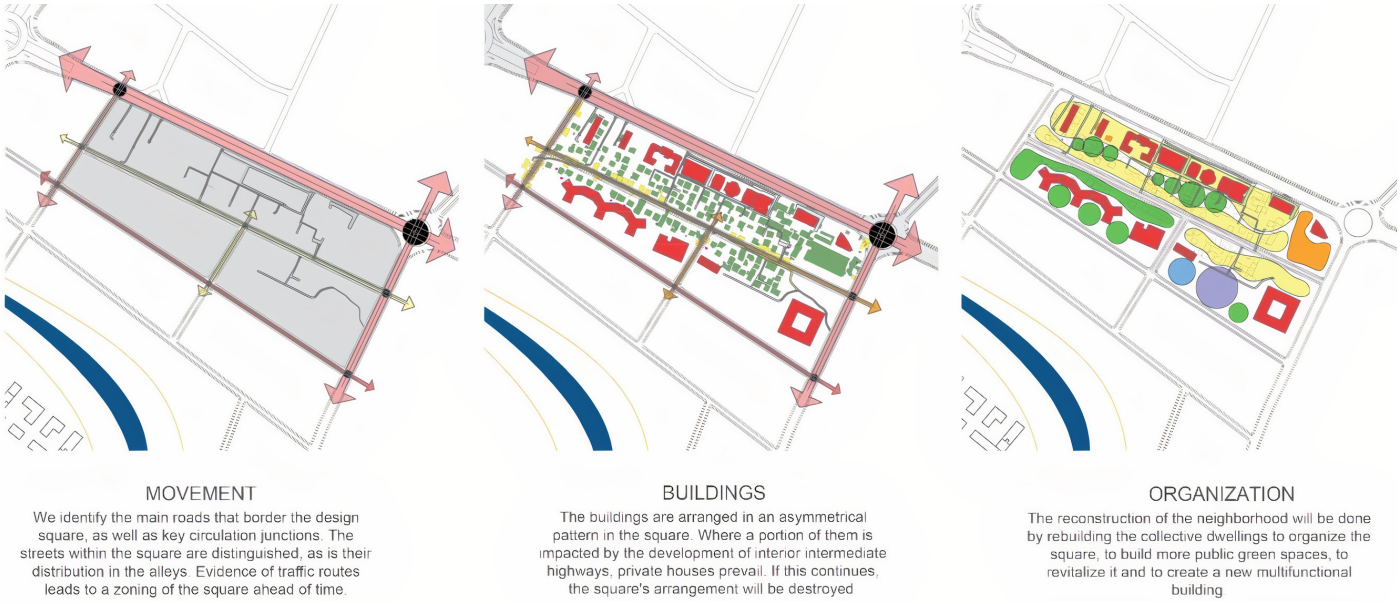


Figure 63: Conceptual for Zone 4

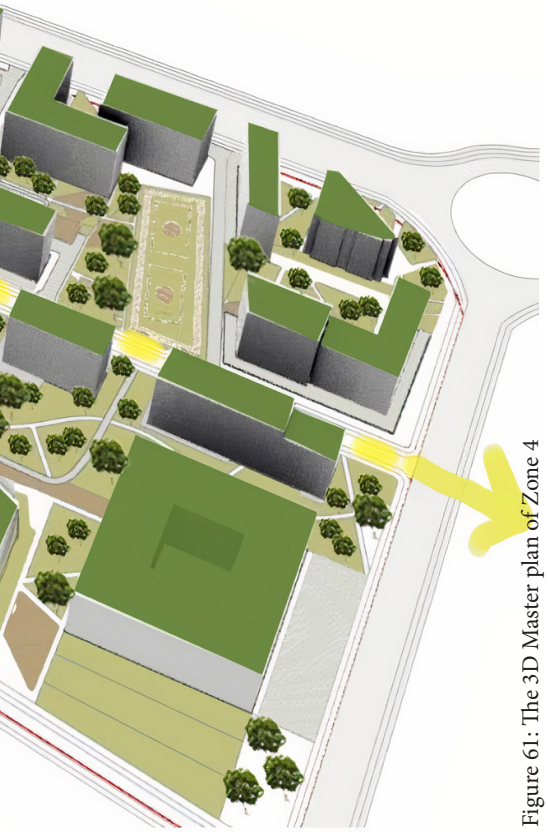


Figure 61: The 3D Master plan of Zone 4

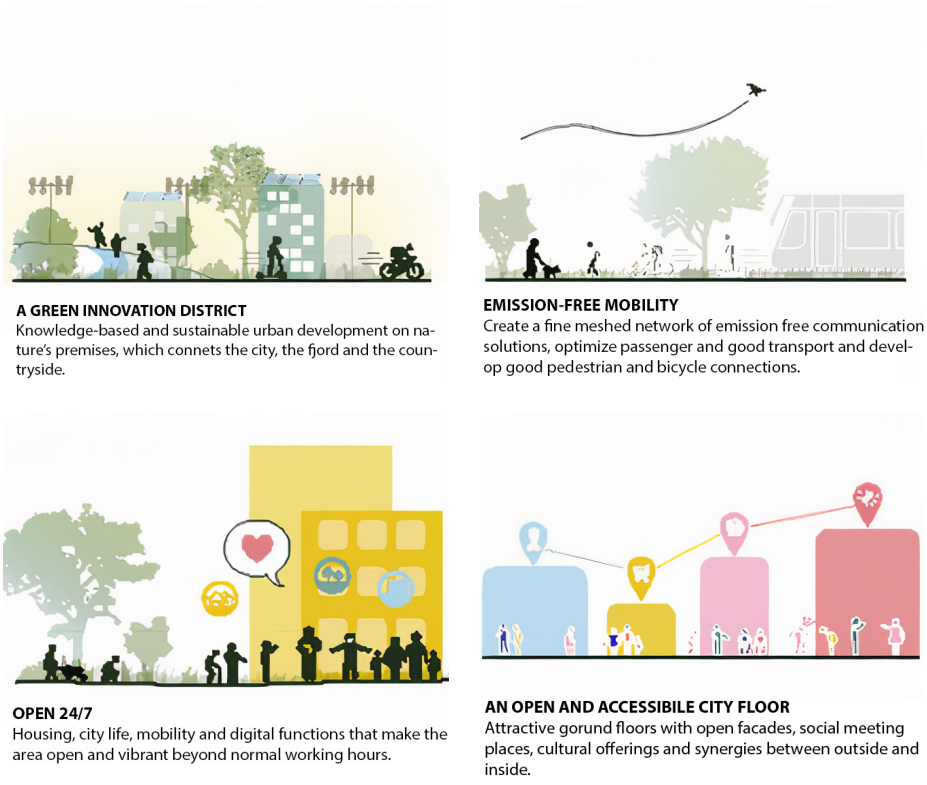
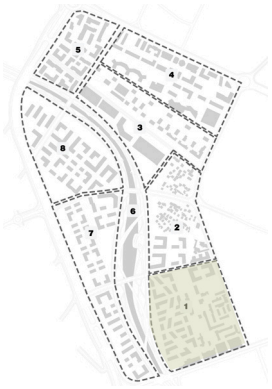


Figure 64: The Solution strategy

Concept

The concept consists of several steps that finalize the design idea. The access roads to the site are taken into account, which regulate the manner of distribution of the area and a more regular division of its plan. The proposal of new roads leads to the destruction of about 40 buildings located there. The construction inside the area has been done without criteria and as a consequence has brought the lack of public green spaces, urban disorganization, lack of interactive, and communication spaces. For these reasons it is in the destruction of private houses by building residential buildings to make room for the creation of common green spaces. Residential blocks should be added to the area to fit existing buildings, in lines and shapes, up to 12 floors. In the proposed design, distances from secondary roads and each other are planned as 3m. The area is revitalized by a multifunctional youth center 24/7, which will contain various educational and entertainment activities. Businesses will be on the ground floors of all residential buildings, increasing the interactivity of the area.



3

Reuse
Material

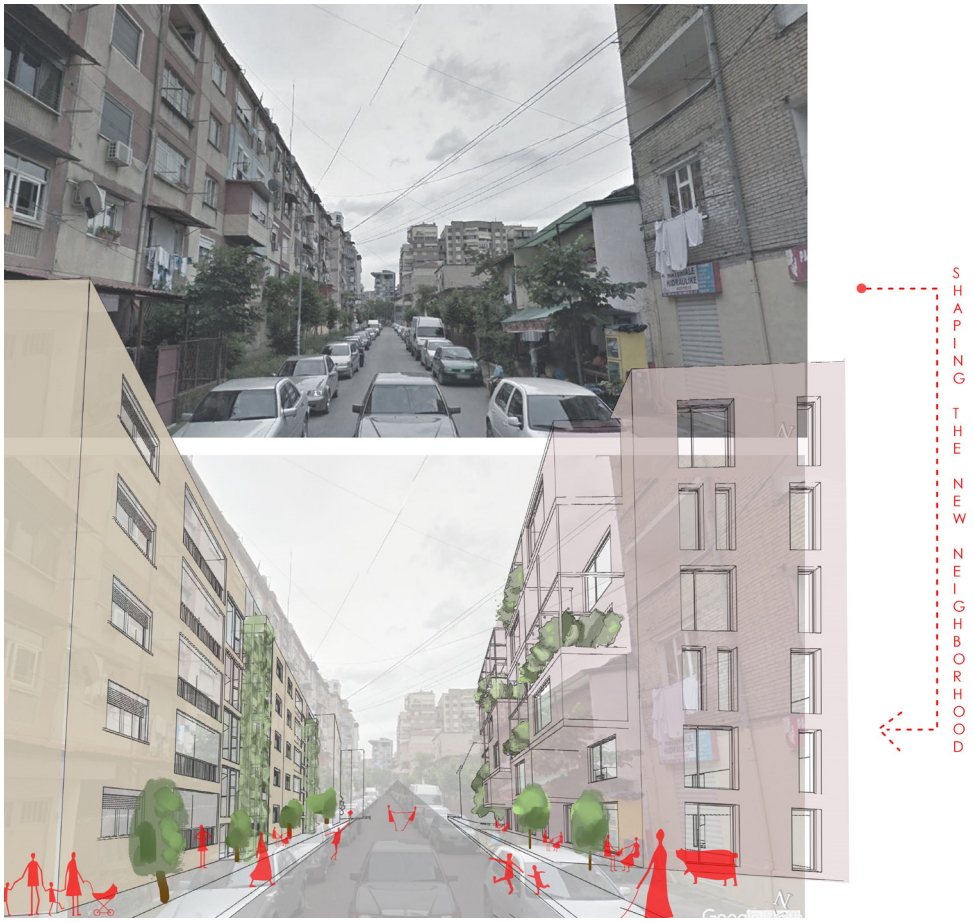


Figure 65: General Analysis; Shaping neighbourhood

Analysis

The studied area is a contrast between the construction of an organized design (goverment instances) and the unorganized one (by the residents themselves). Thus, in a study aspect, the area can be divided into two main cells. The first cell corresponds to the eastern part of the study area. Majority of the buildings are from the communist period, mainly multifamily residential buildings up to six floors in height. The second cell corresponds to the informal constructions. The main problems observed are the lack of a well-organized spatial system, degradation and non-maintenance of buildings, illegal constructions, violations of construction norms, bad construction quality, and consequently high energy consumption due to poor building insulation.

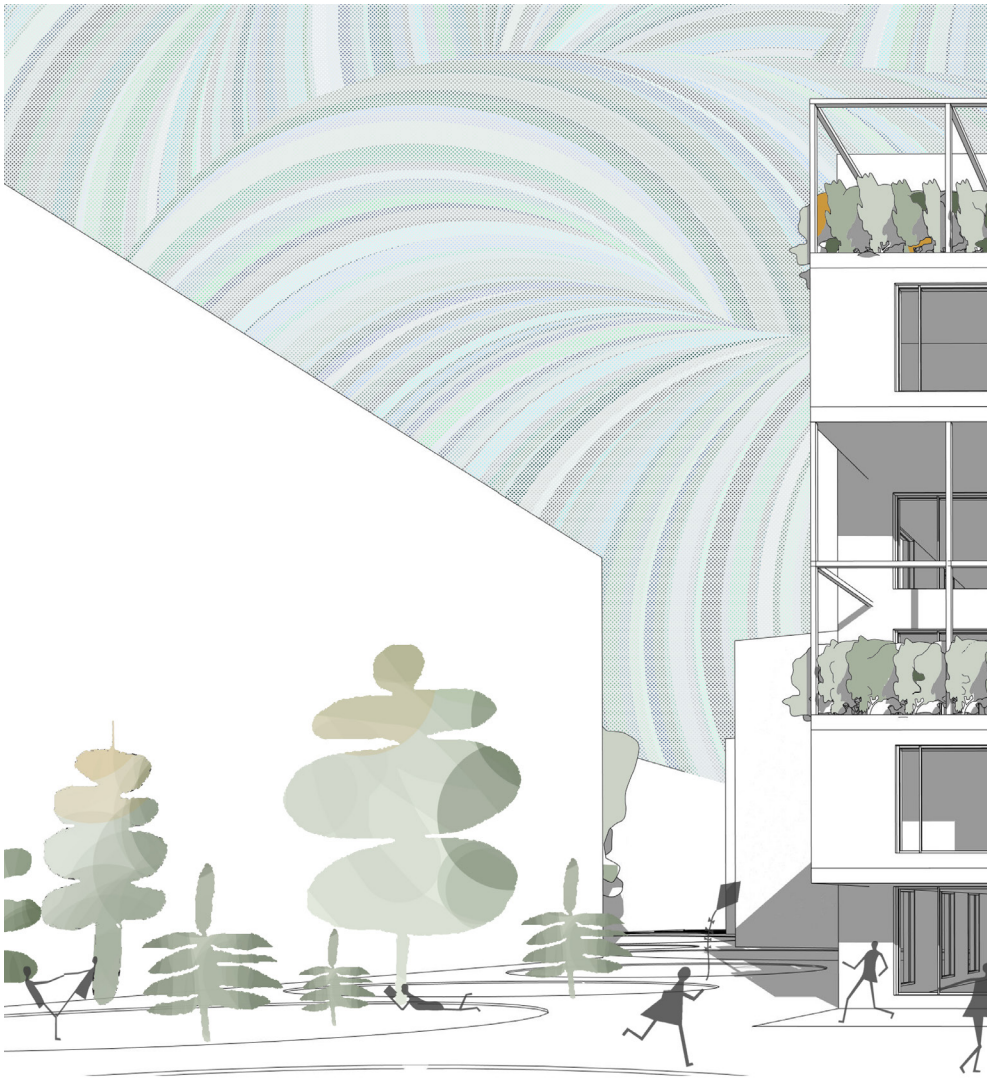


Figure 66: Visualization

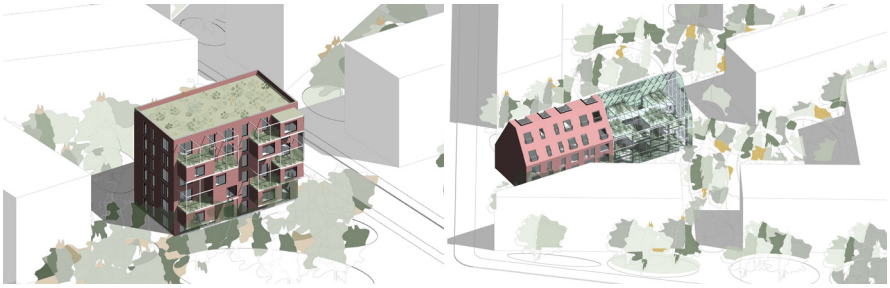


Figure 67: Axonometric view of the Green terrace and Green house

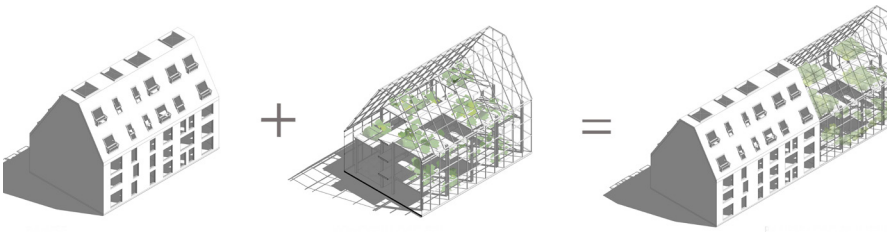


Figure 68: Green house concept

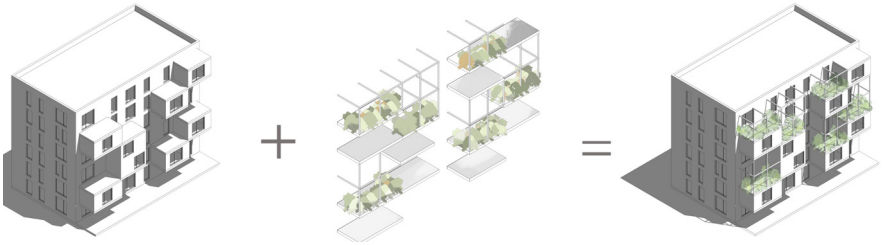


Figure 69: Green terrace concept

Intervention

For the first cell it is considered reasonable to preserve the communist buildings because their demolition does not justify the costs of the new investment and these buildings have not yet completed their years of longevity. For these buildings, their reconstruction is intended, including thermal insulation, replacement of damaged elements in the facade, and the equipment with elevator.

For the second cell the problem extends to a broader view. We propose an organized neighborhood which accommodates the existing residents as well as new residents of Tirana. Respecting the old identity of the area, the construction materials would be repurposed from the demolition of the houses. The proposed buildings are based on the concept of greenhouses, and green terraces.

3

Reuse

Material

Masterplan

By working on public spaces and reusing materials from the demolished houses, adding modular buildings as an analogy with the development of the area, creating multistore social houses and urbanizing the area, connecting with the riverside and creating recreative spaces

Modules

The modules, inspired from historic elements would create a new architectural language for the infrastructure of the area and also for the site. These new modular houses create an identity of their own by the treatment that we do to their facade using the red brick, while combined to the refurbishment of the existing houses, which are layered with white plaster, using a reference of old Albanian housings. The concept of the pedestrian street lies on the concept of a river joining the community while reusing build materials as part of our strategy

Figure 70: Master plan of Zone 2 (Base map: Asig Geoportal, 2021)

Figure 71: Modules

Figure 72: Design strategy.
(Base map: Asig Geoportal, 2021)

Strategy

1-Studying the existing condition
2-Proposed new road system
3-The demolition phase due to infrastructure and building strategy
4-New construction area
5-The social houses
6-New urban layout

Figure 73: Different scenarios

Different scenarios

The concept of the area is divided in 3 scenarios. Each scenario is a model of adapting the existing buildings on the area based on some categorization.

First scenario – for existing single storey houses.

F1:Choosing the site for construction of the module.
F2:Proposing the module for the settlement (1 storey house).
F3:Reorganizing the joint settlements.
F4:Refurbishment of the facade with brick and plaster.

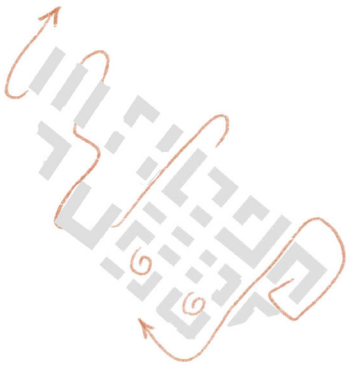
Second scenario: 2 storey mixed use building.
F1:Choosing the site for construction of the module.
F2:Proposing the module for the settlement (2 storey mixed use).
F3:Reorganizing the joint settlements, housing and business.
F4:Refurbishment of the facade with brick and plaster.

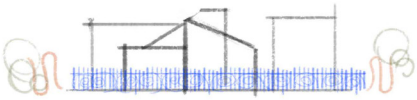
Third scenario: 1 storey module on second floor level.
F1:Choosing the site for construction of the module.
F2:Proposing the module for the settlement (1 storey house).
F3:Reorganizing the joint settlements, housing and business.
F4:Refurbishment of the facade with brick and plaster.

4

Public Space

Water





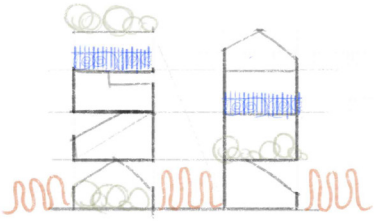
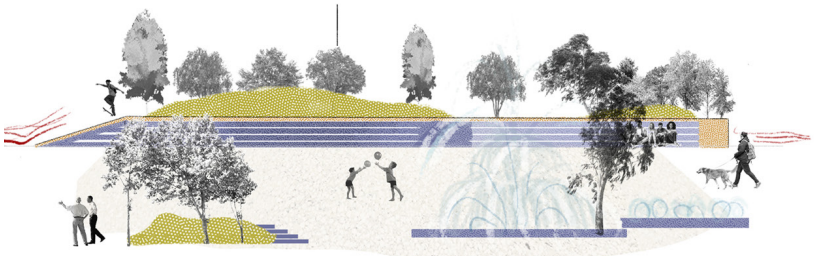


Figure 74: : Demolishing - Rebuilding



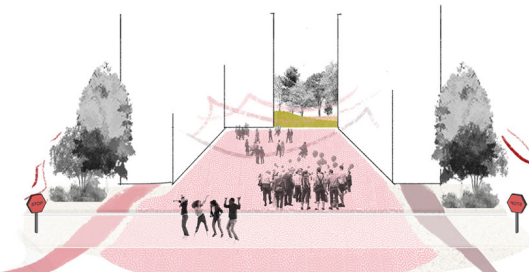


Figure 75: Conceptual illustrations

Masterplan

The concept includes three different interventions that will help with the regeneration of the public space in the given area:

1. A green barrier along the main infrastructure that surrounds the area.

2. Semi public spaces around the residential area to meet the needs.

3. Public space that will connect the area with the riverbank.

To make this happen there will be a need to demolish the informal settlements and keep the new residential buildings of the area.

The green organic barriers will be positioned on the east and west side of the area, at a maximum height of 1.2m, to create a welcoming but also protected environment, mostly from noises, and to give a feeling of confinement. These barriers will be formed from shrubs and trees that can endure air pollution such as linden trees that are widely seen in Tirana's busy streets.

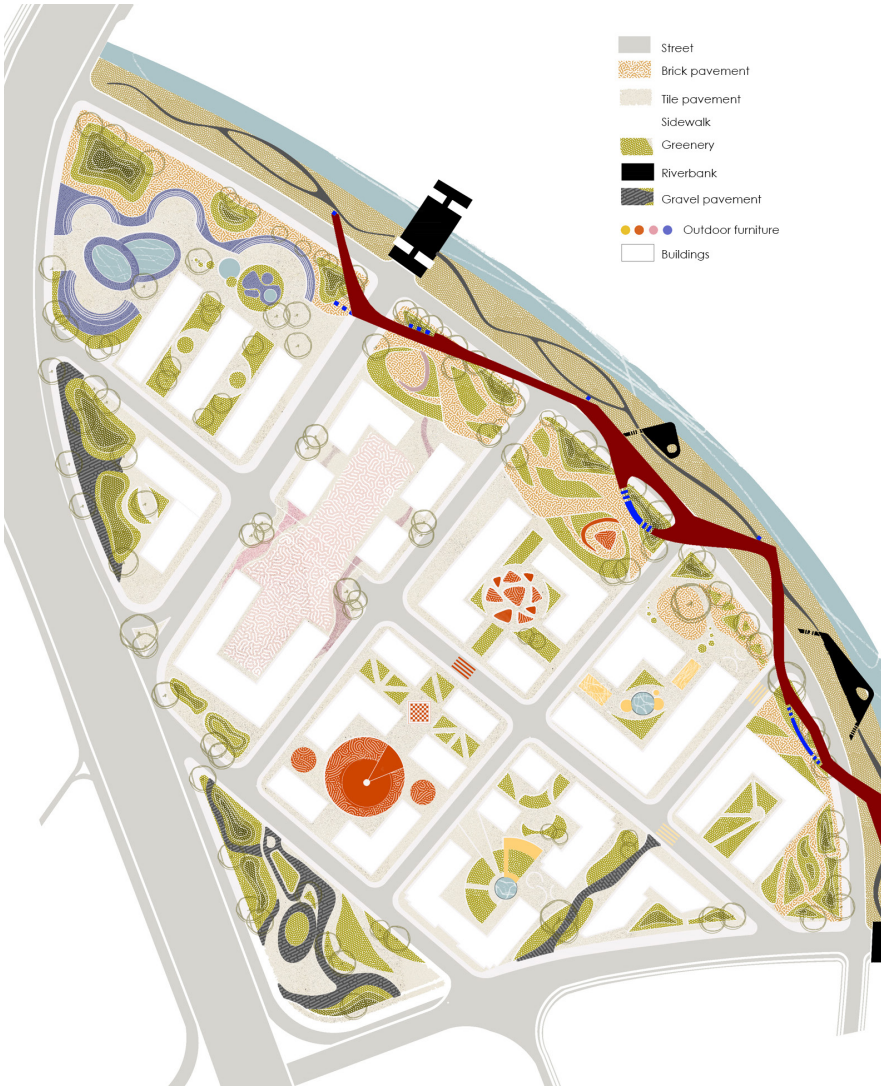


Figure 76: Master plan - Zone - 8 (Base map: Asig Geoportal, 2021)

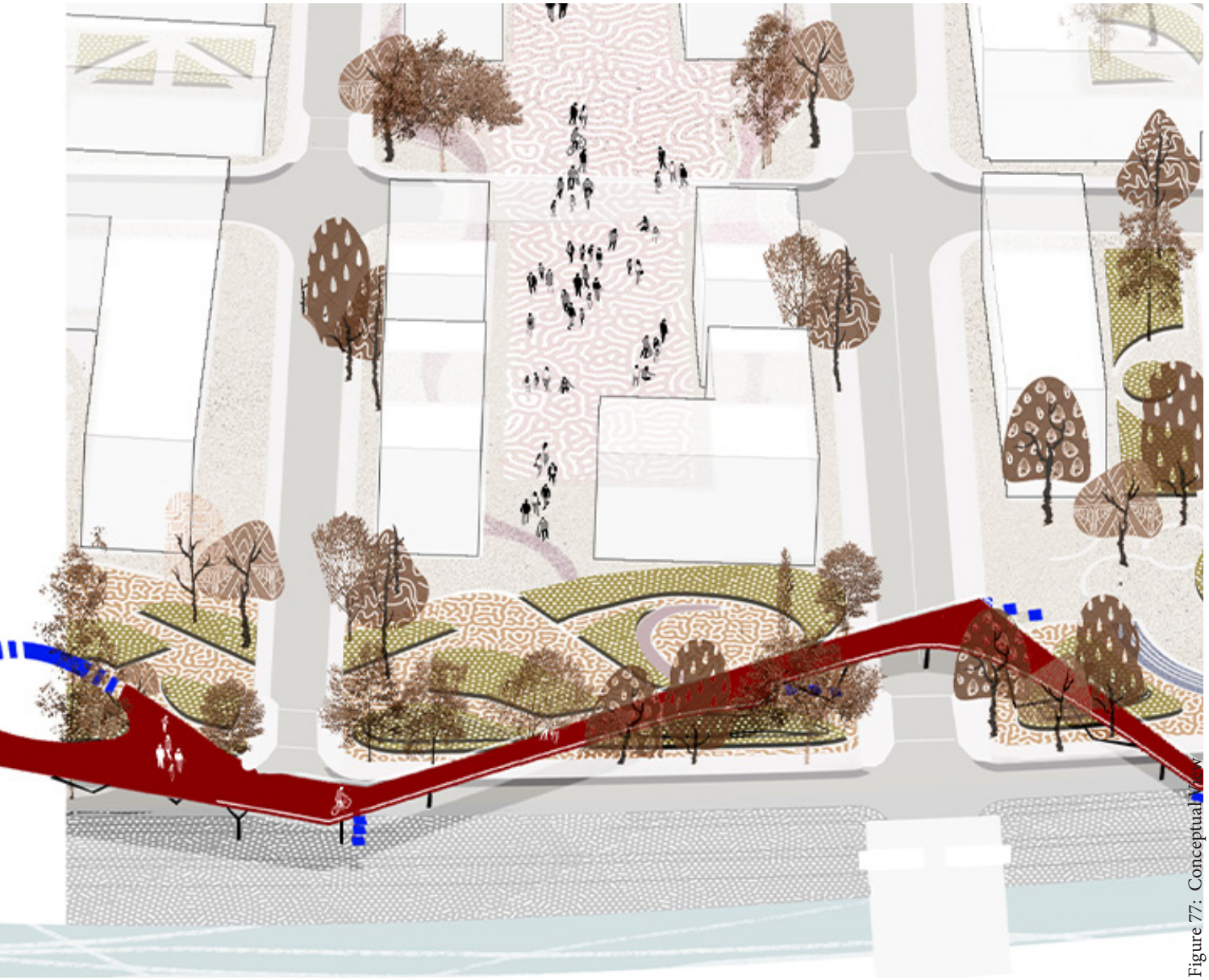


Figure 77: Conceptual View

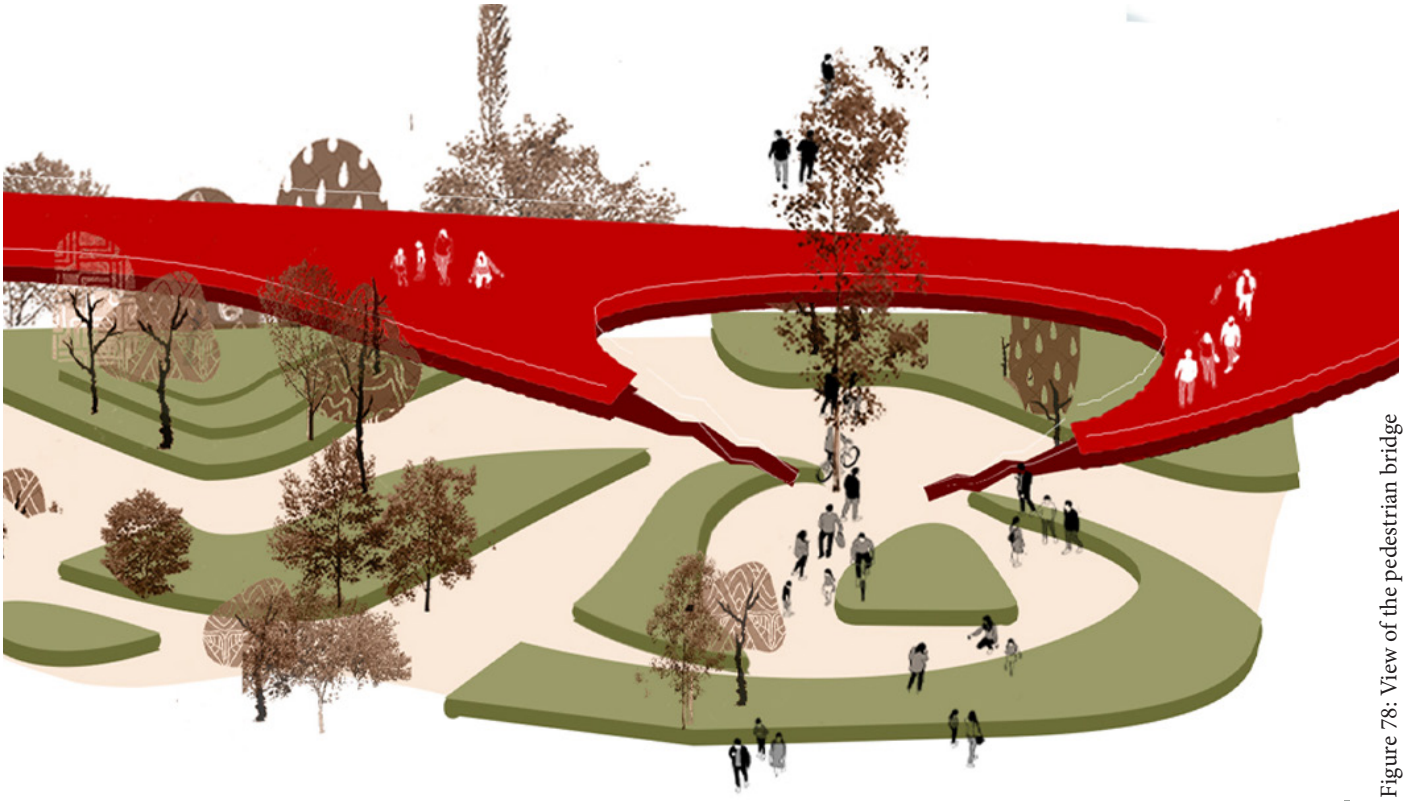
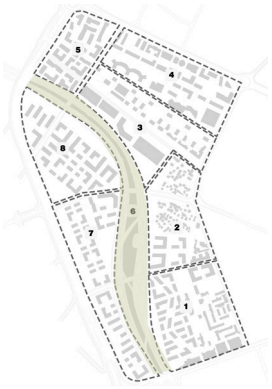


Figure 78: View of the pedestrian bridge



4

Public Space

Water

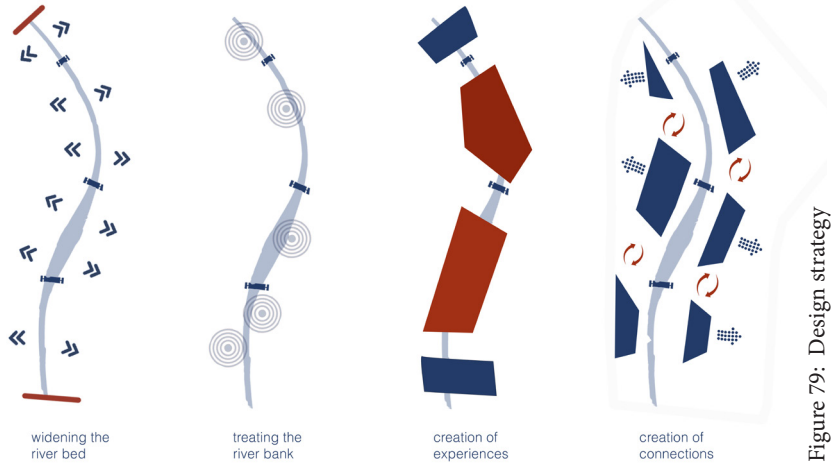


Figure 79: Design strategy

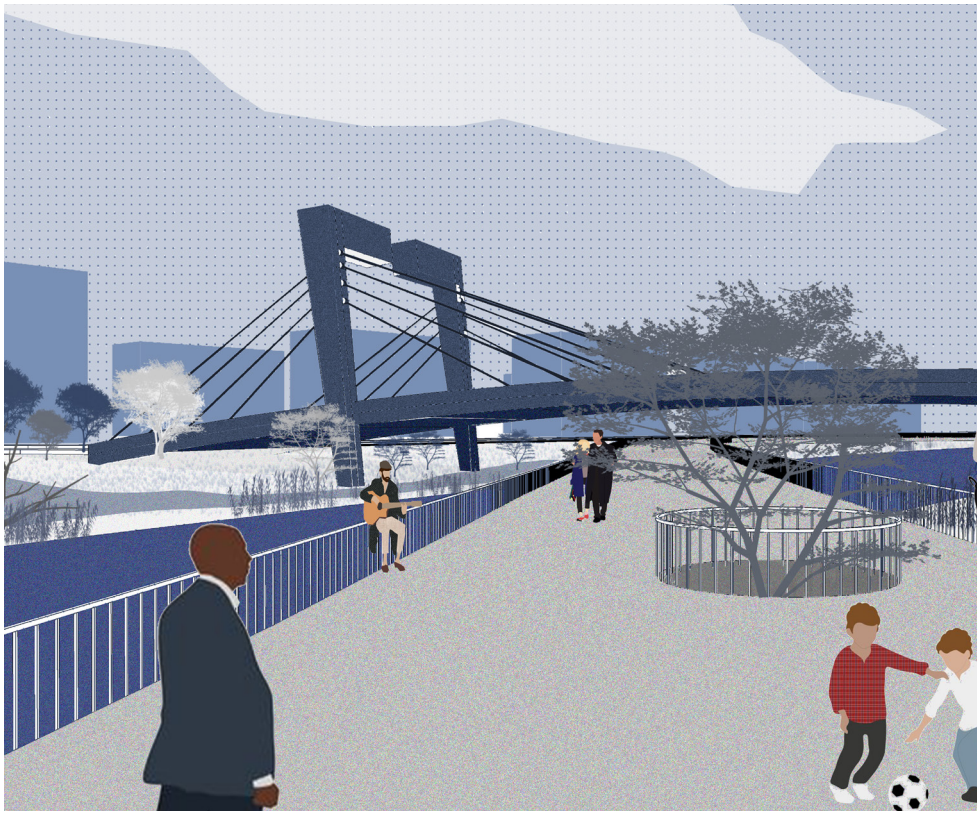


Figure 80: Pedestrian link visualization

Analysis

Why are residents not using the Lana River as a public space?

Barrier | The surrounding walls of individual dwellings in the area eliminate visual and physical contact with the river and in many cases do not allow its access.

Water quality | Due to the discharge of sewage into it, the Lana River has taken on the role of collector causing water pollution and unpleasant odors.

Riverbank | Since the riverbank is untreated, whenever it rains, the whole area around the river becomes muddy, thus inaccessible. Also, some parts of the riverbank serve as waste collection areas.

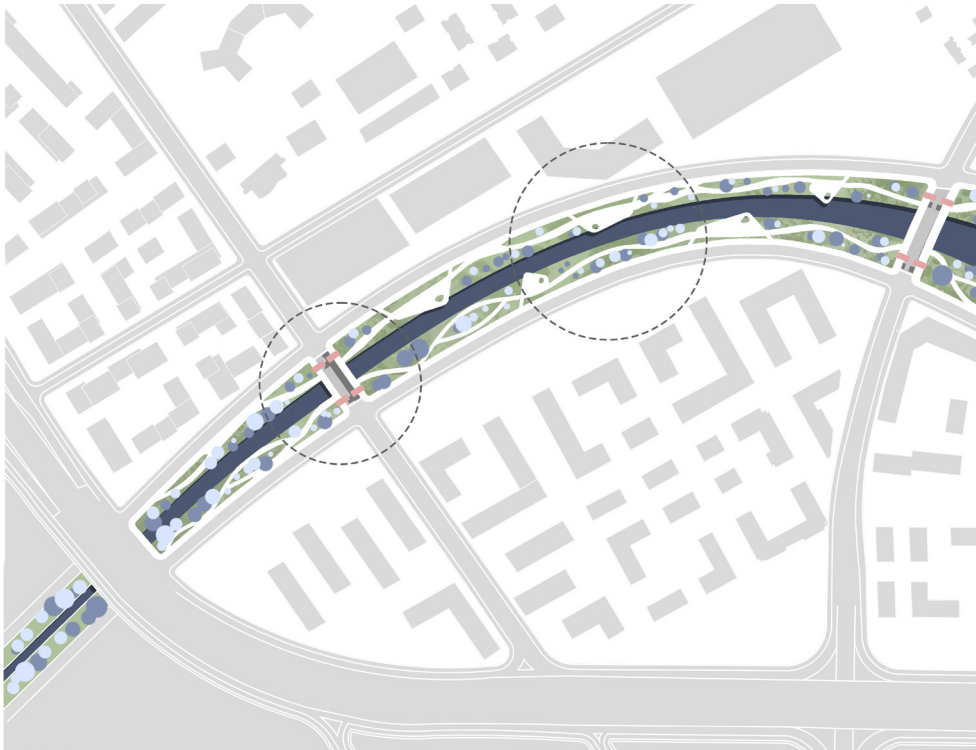


Figure 81: Master plan - Zone - 6 (Base map: Asig Geoportal, 2021)

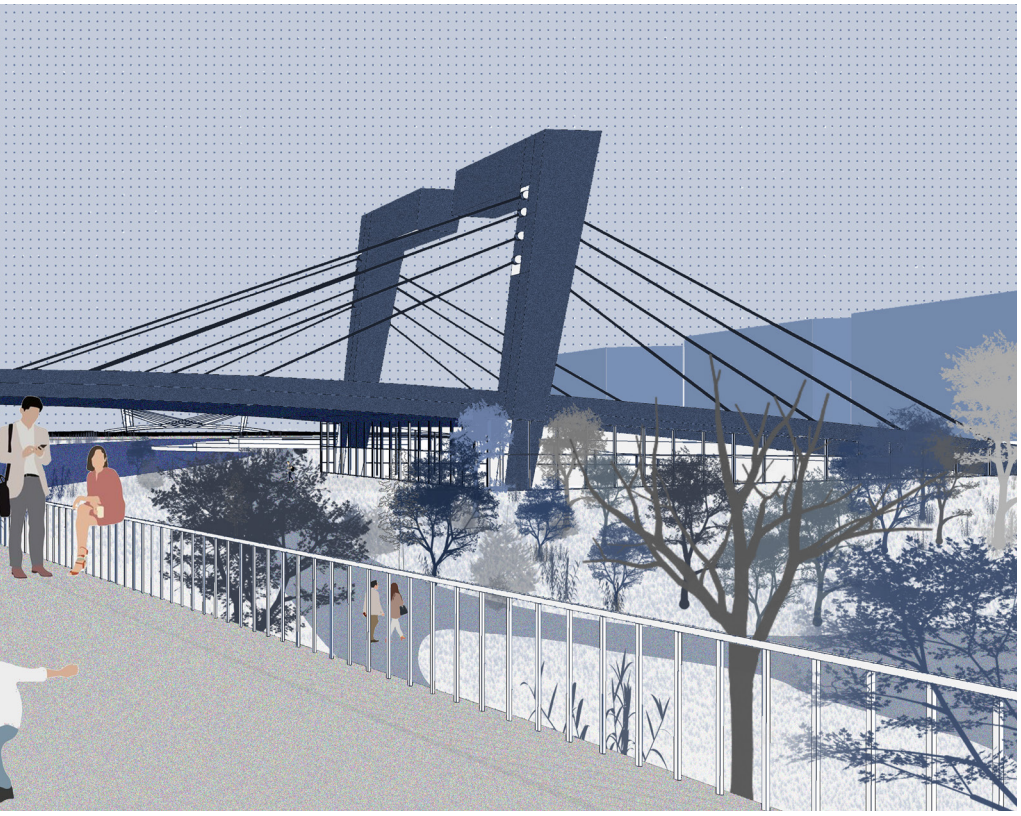
The Strategy

The river is treated in a new way, bringing the expansion of the bed and the increase of public spaces. With the increase of the contact with the river, new ways of treatment of the shore are created.Dynamic spaces are created with different functions and treatment.

Proposed public space typologies

The Amphitheater | Located in the southern part of the central park, it becomes a multi-functional public space. Its shape follows the riverbank, becoming a dynamic recreational space. The Platform Park | An important part of the park is the contact with the river. This part of the park treats this issue through the platforms which serve as public balconies, providing a dynamic experience. The Pedestrian Link | Not only serves as a connecting structure for different plazas throughout the site, but it also becomes a public space above the water itself.

The Water Plaza | Takes on the role of a platform that enables direct contact with the river.



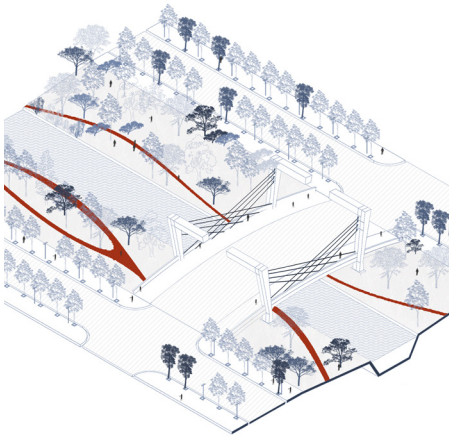


Figure 82: The Bridge

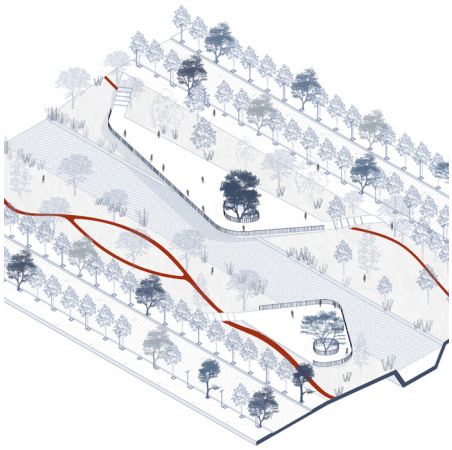
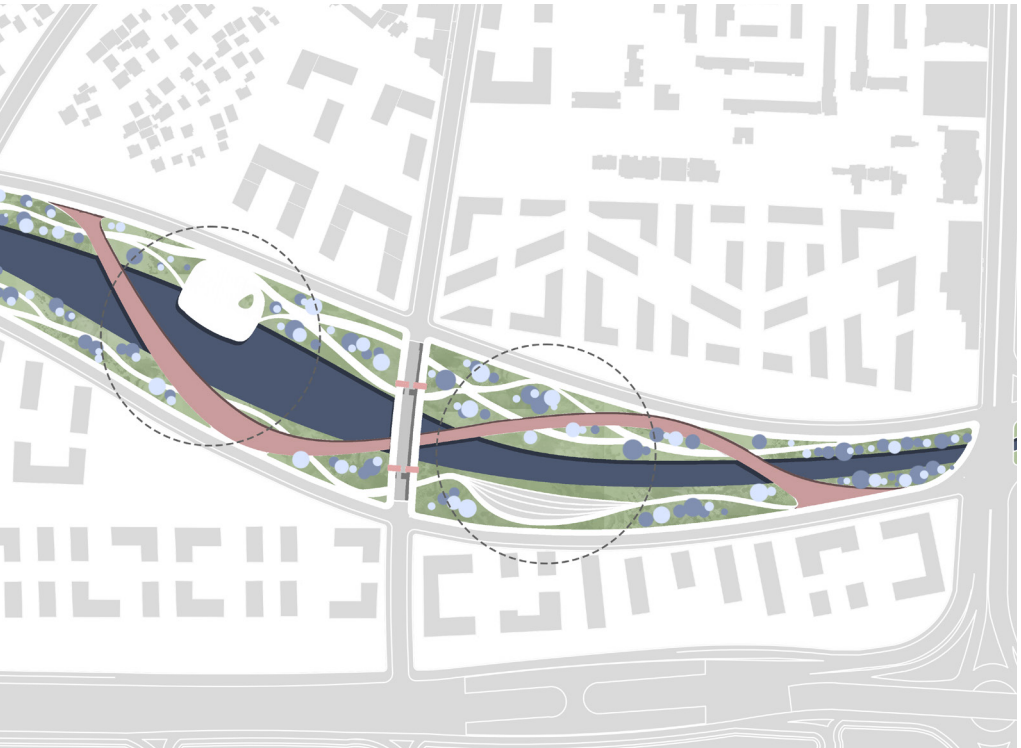


Figure 83: The Platform Park



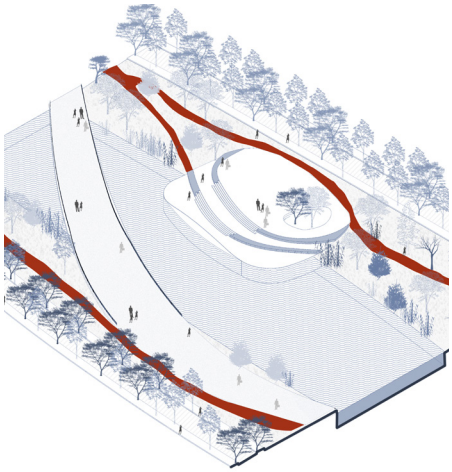
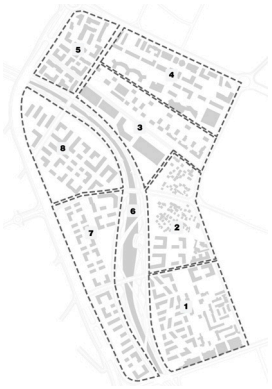


Figure 84: The Water Plaza



5

Urban Regeneration

Mobility

Figure 85: (left to right) Different approaches - Environmental; Social and Economical approach

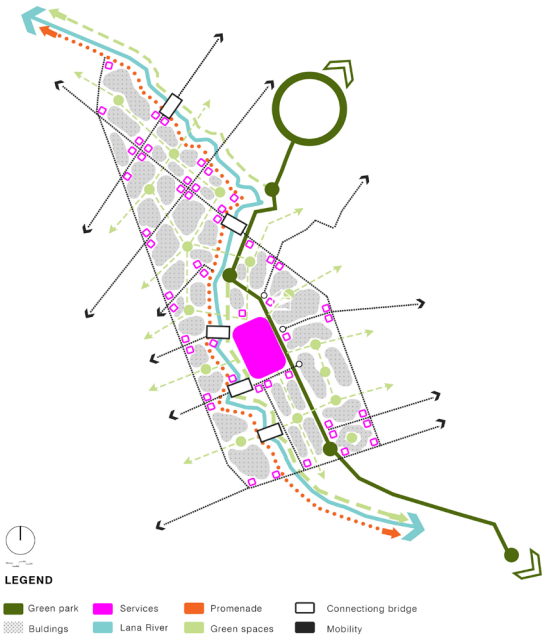


Figure 86: Vision holistic approach

Vision

The vision is about the interweaving of spaces (economic, social, environmental) to create sustainable development. The main goals are as follows:

1. Economic growth in the area by preventing people from leaving.
2. Use of rivers and land for social and economic purposes
3. Establishing a significant pole

Results and benifits

Cooperation between the activities of the area brings several benefits:

1. Improves the local economy, not just the local economy
2. Improves social interaction and interaction with other parts of the city.
3. It increases the welfare and value of the area.
4. Unemployment decreases with the creation of commercial and recreational spaces.

Interdependencies of activities

1. "Generator" of the area
Commercial and research space for "flowers and plants" This brings indent to the area and strengthens the connection of the whole area by economic means. This connects the inhabitants socially and economically.

2. "Fertile soil" greenery
The interaction of green and recreational spaces connects not only to the river park but also to the area's centre.

3. Lana River
The function of the corners is defined by the presence of the river and the integration of the branches into residential areas at the corners. Also, the pedestrian path along the river brings the connection of the space with the main parts of Tirana and its integration.

4. The inhabitants' way of life
Improving degraded spaces and living spaces increases well-being in the area.

Environmental approach

The vision aims to crate a green crown inside the city. These areas are existing and proposed green spaces where each has a unique character. Green spaces are a key point of the TR30 PPV strategy. This creates green spaces distributed in the main rings of the city. These spaces are organically connected to each other, thus creating a connection.

Social approach

The circle of parks that are created has a different character. Each has a story and a specific identity. Presented in the diagram above, we also have the focus of the development of these identified poles.

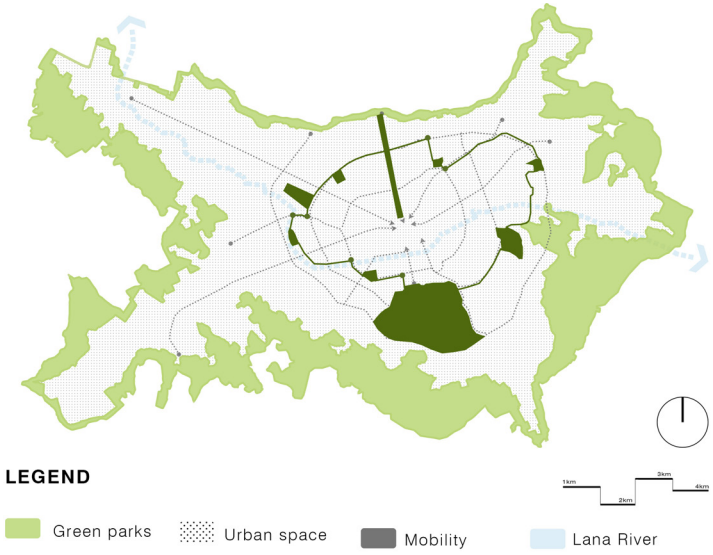


Fig. 87: Environmental approach (in city scale)

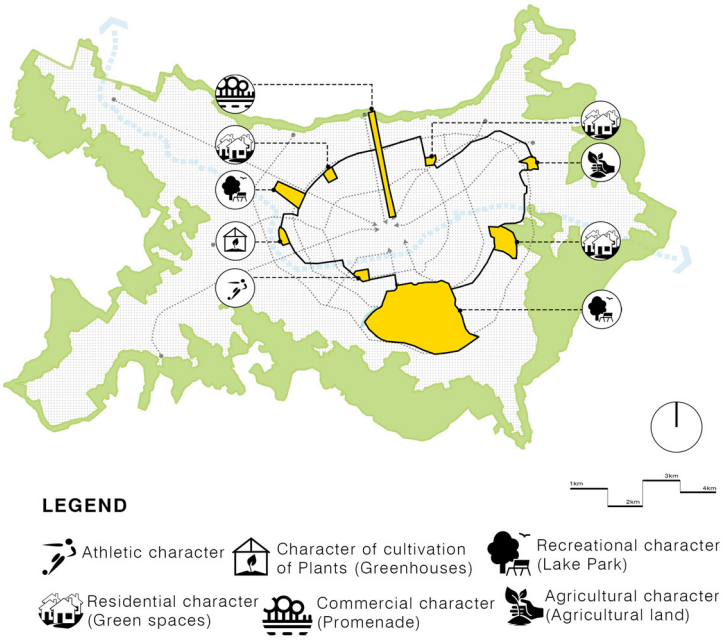


Fig. 88: Social approach (in city scale)

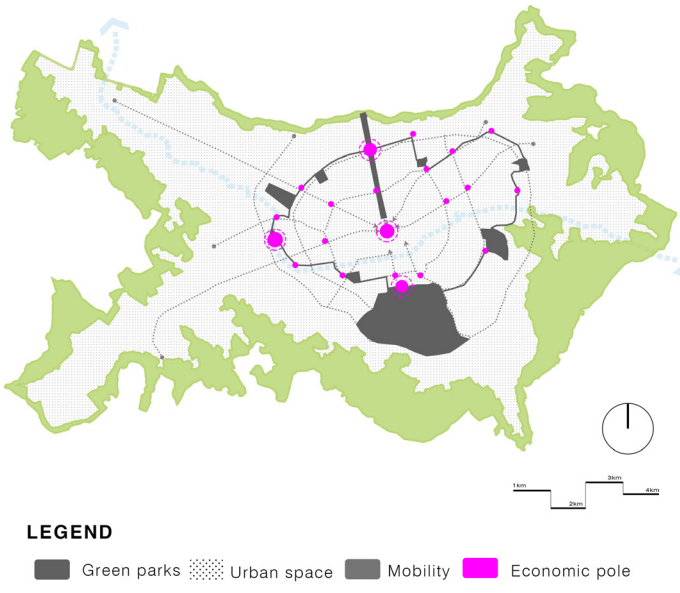


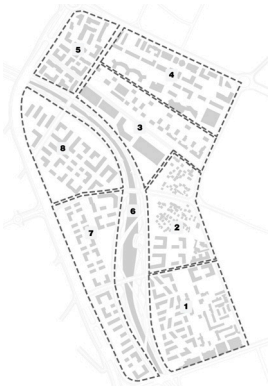
Fig. 89: Economical approch (in city scale)

Economic approach

The city of Tirana tends to be polycentric. With the created crown, we also have the creation of points and poles, as throughout this crown, so at the intersection of the main axes. establishment of various centres and this one PPV strategy, adding functions to different types of identity base parcels at road junctions.

For us, it is very important that the area gets another development and brings new ideas to Tirana. It was thought to be possible to build a greenhouse in the same position where the old greenhouses were located. Greenhouses will bring a new spirit to this neighbourhood, helping to improve the economy and increase vegetation areas. In addition, the construction of greenhouses will increase the level of social life and will create more opportunities for residents.In addition to greenhouses, another important point of our project is the construction of a market and a scientific research centre. A vicious circle will be created between these three elements. What will be studied will be planted in greenhouses and then sold on the market. In this way, the economy will be improved by creating a safe production-sales chain.

Normally, river regeneration will get the main attention because it is also the representative element of the area. It is not enough just to clean the riverbank; a very good implementation of greenery and infrastructure is required too.



6

Urban Regeneration

Mobility

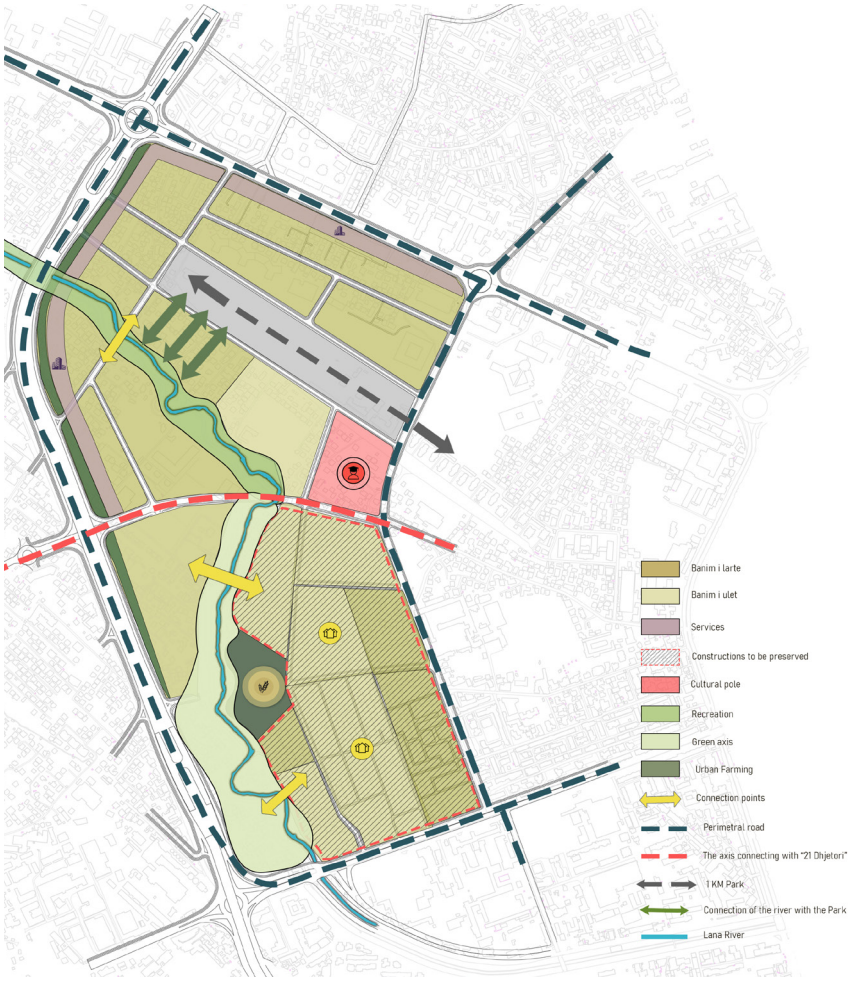


Fig. 90: Proposal scenario (Base map: Asig Geoportal, 2021)

Site Analysis

A broad analysis is created based on the field research that highlights the key difficulties. A series of interviews were performed in order to undertake a more in-depth investigation of the neighborhood's underbelly. The approach utilized is the matrix, in which the main challenges and potentials of the region are organized in a table format based on three major areas of sustainable development: social, economic, and environmental (img.1). This area is a problematic area that has been neglected for a long time, with few initiatives for development and improvement. The following are some of the important points discussed:

Residential areas

The most concerning aspect is the uncontrolled informal developments, which have not followed any rules or limits regarding dimensions, heights, or territory. This has caused a fragmentation of the area in many plots with buildings without permits that are not integrated within the infrastructure. Some of these inhabitants have continued to engage in activities that they did in rural regions, such as growing agricultural products in their backyards.

Transportation

The area is separated into two areas due to natural factors, making communication difficult between them. The area's roadways are unorganized and sporadic. Furthermore, there aren't enough sustainable transportation options, such as walking, cycling, and so on.

The Lana River

The Lana River has lost biodiversity and suffered environmental degradation as a result of contamination from industrial and urban waste. However, treatment has the potential to generate a green axis that would considerably improve residents' liveability.

Vision And Goals

The vision for the Lana River area is to achieve economic prosperity and social cohesion of this community by taking advantage of its strengths. All strategies and proposals in this plan related to these goals, are identified as the most important for the community members:

Economy

1. Growing the local economy through efficient land use development.
2. Create new employment opportunities
3. Attract new businesses to the area
4. Develop agriculture and livestock
5. Promote agrotourism
6. Restore the area's attractiveness

Residential areas
Expanding and improving available housing opportunities.Avoid the relocation of inhabitants. Prohibit uncontrolled construction in public open spaces. Densify residential areas. Improve the existing housing stock

Environment
Creating a safe, attractive, and sustainable environment.Protect and conserve important natural resources. Use of sustainable "green" construction practices

Transportation
Improving the infrastructure network.Use of more sustainable transport methods (walking, cycling, etc.). Establish connecting points on both sides of the river
Improve local road infrastructure conditions

Social and cultural aspects
Integrating different functions in the area to ensure diversity, social sustainability, and a sense of security.Create safe and attractive public places where people will want to gather and participate in their community. Create urban places that are both welcoming and safe for walkers and cyclists.Access to social services, education, cultural arts, and recreation for people of all ages.

Strategies and Proposals
For the area to be better integrated with the city, the strategy is seen on a city-wide scale. The city's planning strategies for the territory's development and growth as well as how they relate to our location have been identified. The main poles of the city have been recognized. The analysis has led to the identification of focal centers with economic, social and environmental potential for urban regeneration

Conclusion
Improvement of the physical condition of the river by cleaning it, adding low and high vegetation and creating a natural park that goes through the entire neighborhood.
Improving the existing house blocks, taking into account the human dimension, the addition of recreational spaces and paths for pedestrians and bicycles. New residential blocks will be built for densifying the area.
New economic poles will be created, increasing the economy of the area by creating new employment possibilities.

Fig. 91: Strategies scheme

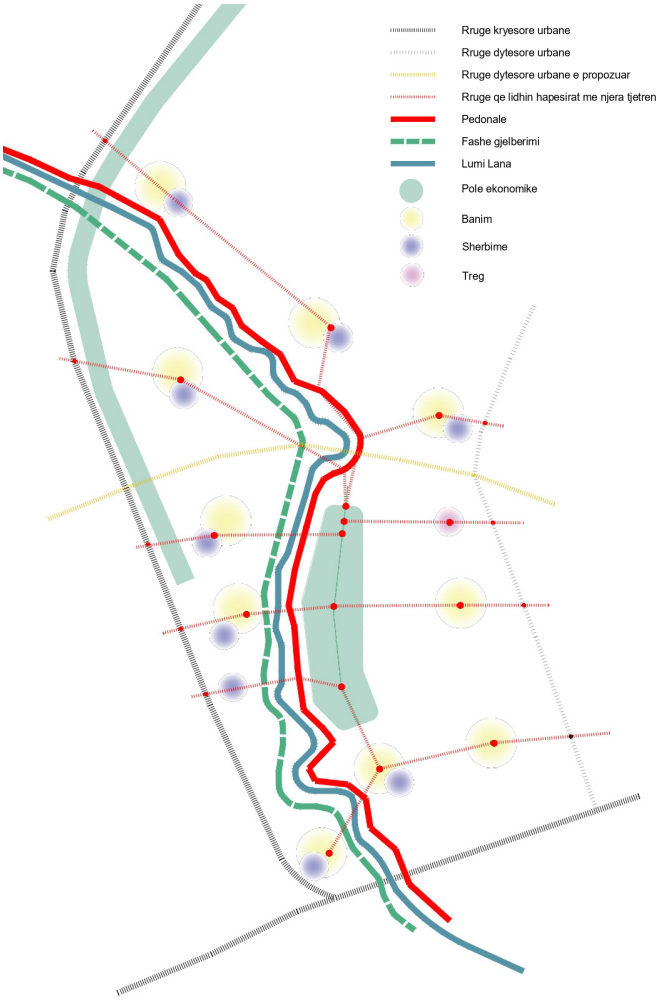


Fig. 92: Master plan (Base map: Asig Geoportal, 2021)

07 Conclusion

From REAP by Larita Inthisone

To conclude, the REAP students have been taught to approach climate resilience and sustainable urbanism through different scopes: Water, Mobility, Energy, and Waste. There are varying approaches to achieve sustainable urbanism and each approach requires a broad range of views and expertise in different levels of society. This brochure has presented six unique approaches to the different REAP scopes for the informal study area in western Tirana.

One energy group has proposed a multistory building, a solar-powered micro-grid that supports an energy mix and increases energy circularity resulting in less dependency on fossil fuels.

Another energy group suggests a multifunctional energy hub that utilizes Tirana's solar generating capabilities while also creating public spaces to increase social engagement.

The Waste group introduced a neighborhood composting system to address the excessive waste in the area and increase community involvement.

One has proposed a parking management scheme with an underground parking garage to reduce traffic congestion and emissions.

The other mobility group encourages active transportation through street revitalization.

Lastly, the water group proposes a water renaturation of the Lana river to clean up the water and includes public areas to address the lack of public areas in the neighborhood.

When executing the different approaches, each group has analyzed the background context of the study area. The history of the country has influenced the existing conditions of the informal neighborhood. As stated, multiple times throughout the paper, the end of communism in Tirana resulted in mass uncontrolled urbanization. Subsequently, with weak institutions after this period, informality proliferated throughout all sectors. This has provided many opportunities to sustainability improve the urban fabric of the city.

All project proposals have demonstrated a well-rounded approach to their project execution. Each group has acknowledged the financial feasibility and long-term sustainability of their projects. They have also recognized the importance of the community participation required for public acceptance of their strategies, especially in an informal context.

The REAP students of Hafencity Universität have joined the group of other academics, researchers, government officials, planners, and others on the quest of sustainable urbanism to fight the negative impacts of climate change and to achieve climate resilience in different cities around the globe. The city of Tirana provides an illustration of the potential opportunities for sustainable strategies to be implemented in informal regions. However, further investigations are needed to fully comprehend the background context of each location and sector, because all approaches are not one size fits all for sustainability. Ultimately, the mutual effort to improve social, economic, and environmental conditions on the planet can result in impactful changes.

From FAU by Sidorela Hoxha

The importance of this project stands in the confrontation and understanding of the obstacles that the informal area arises along the Lana River. This area has a lot to offer, good solutions can help to adapt and improve it. Through interviews with residents of the area, but also from numerous visits in the area we managed to define the positive and negative aspects that the area shares.

Interventions in the area are intended to be rehabilitative and adaptive. In this way, an increase in the quality of lifestyle, economic growth, quality of social life, etc. will be achieved.

Initially, a new road infrastructure is proposed with standards for the area. A good infrastructure connects in such a way to provide higher quality opportunities for employment, healthcare and education. In consequence a number of informal objects would be demolished. Furthermore, this decision is impacted from the extension and enlargement of "Teodor Keko" highway.

The informal settlements disconnect the area due to the privatization of every public surface. The need to free up land and reduce the density of the area makes us propose the demolition of most of the informal buildings as they do not carry a history of development. In this way we propose the construction of several high-rise residential buildings in order to achieve the intensity of construction for the area.

Thus, we have freed up land by creating public spaces with better quality of life. All these public spaces will provide a recreational, entertaining, relaxing atmosphere such as gathering spaces, sport facilities and different installation to assure a better continuity throughout the area.

Regarding the tourist aspect, we have proposed the creation of an Aeronautical Museum in the area called the "Former Aviation Field" positioned in the east part of the area, turning it into a new attraction for Tirana, and why not also a development and recreational center for youth.

On the other hand, the rehabilitation of the Lana riverbank and its release from the informal settlements which had become parasites to it, gives the possibility of creating a large green park that unifies the whole area. It is proposed to create promenades, panoramic balconies and amphitheaters and large sports fields near it. In this way this area will be turned from a neglected artery and polluted with waste, into a large and functional park for the area but not only.

In conclusion, the main goal of the whole process is to use the land surface as efficiently as possible and to increase the quality of life and why not also density by making it a new attraction and a good example for the city of Tirana.

Joint conclusion from REAP and FAU

by Florian Nepravishta, Juljan Veleshnja, Maria–Ioanna Giannousopoulou, Ronilda Dedvukaj, Tim Fettback

Conclusion of workshops and exchange between the universities

In the age of climate change, rapid urban population growth and increased demand for natural resources, sustainable and integrated urban development is highly relevant to mitigate and adapt to the impacts on urban systems and population worldwide. Innovative, contextually appropriate, climate responsive and resource efficient planning strategies strengthened by participatory approaches are indispensable for integrated and sustainable development concepts.

The collaboration and exchange between the two master degree programs "Resource Efficiency in Architecture and Planning" (REAP) at the HafenCity University Hamburg (HCU) and the Master in Architecture and Urbanism of the Faculty of Architecture and Urbanism (FAU) at the Polytechnic University of Tirana, enabled students to learn about particular challenges related to the implementation of resource efficient planning as well as public engagement and participation in different cultural, geographical, socio-economic and path dependent urban conditions. The focus of the exchange program was "Resource Efficient Urban Regeneration of Informal Settlements in Tirana, Albania" and the development of solutions for ongoing transformation. The program focused on informal settlements in Tirana, in the central – west part of the city, that have been expanded along Lana River over the last 30 years.

To initiate the collaboration between the students from both master programs the students participated in two-weeks of workshop, one workshop week in Tirana (online) and one week in Hamburg (physical presence). This international and interdisciplinary approach support young researchers by facilitating an exchange of research methods, approaches and planning techniques between universities, staff and students. As a final output of this cooperation for the winter semester 2021/22 we compiled the final proposals of students from both Master programs in this joint publication.

During the workshop weeks a series of lectures that assisted in understanding the planning and design practices as well as regeneration processes of selected case studies in Tirana and Hamburg took place. Particularly, during the workshop week that took place in Tirana online lectures spanned topics from explaining an overview of the history of urban planning of the city to future plans, concepts of informality, public participation and water sensitive urban design. In addition to the lectures and due to the inability of REAP students to travel to the selected project site, FAU students conducted field-visits, on-site interviews, observed and documented the site in Tirana. Students from both universities discussed, analyzed and drew conclusions from their findings.

Students from REAP Master program worked in six groups with different thematic focuses with regards to their analysis of the selected project site and consequently concept development and final proposal. Two groups focused on energy, two on mobility, one on water and one on materials. The students further developed their concepts by literature review and expert interviews. The FAU students' concepts were guided by the idea of a sustainable development of the area, in order to transform it on new strategic pole. Their concepts came after a detailed study of the Masterplan of Tirana, which proposes a new road network for the area and the Detailed Local Plan, which provides the density that the new buildings should respect.

All groups developed concepts that increase resource efficiency. Students could benefit from expert feedback which validated their concepts based on the realities in Tirana. Especially REAP students also got to understand informal urban development and its effects in the Tirana context. Furthermore, they were introduced to the concepts of urban regeneration, urban upgrade and reuse. All students were introduced to the application of blue-green infrastructure, and its benefits including sustainable urban water management, mitigating the urban heat island effect and recreation. Additionally, sustainable mobility concepts with low energy demand, reducing pollution by implementing solid waste and wastewater management, and the decentralized generation of renewable energy were discussed and included in the proposed concepts. The groups also focused on creating spaces for people as a means to increase the general quality of life of the project site. Despite the different thematic all FAU students agreed on changing the public spaces system along Lana River that was proposed on the Masterplan by improving it. The new proposal aims to connect the inhabitants with the river by bringing them closer to it through a continuous system of public spaces and the expansion of its bed. Another concept that was accepted by all FAU groups, also proposed on the Local Plan, was the increase of the building intensity as the best way to free land for public spaces.
Challenges that limit the implementation of these improved concepts were identified and solutions could be witnessed among other during guided tours in Wilhemsburg and HafenCity in Hamburg. For example students experienced that public green spaces, sustainable mobility concepts and mixed land-use development (which reduces travel distances and increases social interaction) need to be considered from a very early planning stage, and if implemented well significantly increases the value of an urban area. Furthermore, insufficient consideration of social requirements (such as unemployment and social deprivation) negatively affects and hinders sustainable urban development. This was observed particularly during the visit and investigation of the Steilshoop case study in Hamburg. We conclude that an effective urban regeneration approach for an existing neighborhood does not only consider improving the physical environment but also empowering the community involvement.

During the presentation of final concepts the competition for limited public open spaces could be observed. Multifunctionality of open spaces, such as for water management, mobility and recreation simultaneously was well addressed by all groups. Furthermore the students faced significant challenges caused by informal development of the project site. Creating new public spaces or improved road networks is significantly restricted by existing unplanned construction. Potential responses observed from the students' proposals could be linked to different approaches of and responses towards urban regeneration, particularly with regards to the physical aspects. Some groups chose to demolish and restructure anew the urban fabric and neighborhood image whereas others chose to preserve the existing urban fabric and informal settlements, to rehabilitate and adapt to the existing fabric and infrastructure. In both approaches regeneration and restructuring of public spaces was crucial. Additionally to physical alterations all proposals addressed adequately other important aspects of urban regeneration such as renewal of the urban economy, social interaction and equity, city image and participation of local population.

Overall this joint academic project exposed students and lecturers to new contexts, their challenges and opportunities, and their individual approaches which enable sustainable urban development.

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09 Figures

Abbreviations

ALUIZNI	Agency for Legalisation, Urbanistion, and Integration of Informal Areas and Buildings
CHP	Combined Heat and Power
DAAD	Deutscher Akademischer Austauchdienst
DHW	Domestic Hot Water
DWTP	Drinking Water Treatment Plant
EU	European Union
FAU	Polytechnic University of Tirana Faculty of Architecture &Urbaism
FIT	Feed-In Tariff
GIS	Geographic Information System
GIZ	German Agency for International Cooperation
GWh/a	Gigawatt hours per annum
HCU	HafenCity University
HPP	Hydro Power Plants
IDM	Institution for Democracy & Mediation
kWh/a	Kilowatt hours per annum
MWh/a	Megawatt-hours per annum
MSW	Municipal Solid Waste
PDV	Plovdiv Airport
PV	Photo Voltaic
REAP	Resource Efficiency in Architectur and Planning
SDG	Sustainable Development Goal
UN	United Nations
UKT	Ujësjellës Kanalizime Tiranë

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