

URBAN REGENERATION OF LARGE HOUSING ESTATES POST-SOCIALISM

IN NIŠ, SERBIA

**RESOURCE
EFFICIENT PLANNING
IN THE
URBAN-SOCIETAL CONTEXT**

**RESOURCE
EFFICIENCY IN
ARCHITECTURE AND
PLANNING**

MASTER'S PROGRAMME

**10TH GENERATION
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LIST OF ABBREVIATIONS

AD	Anaerobic Digester (Plant)
BTI	Bertelsmann Stiftung's Transformation Index
CEE	Central Eastern European countries
CIAM	Congrès International d'Architecture Moderne
CO ₂	Carbon Dioxide
DAAD	German Academic Exchange Service
EEA	European Environmental Agency
EU	European Union
GC	Garage Capitalism
GDP	Gross Domestic Product
GIZ	German Corporation for International Cooperation
LHE	Large Housing Estate
MSE	Multi-Storey Extension
MSW	Municipal Solid Waste
PUC	Public Utility Company
PV	Photovoltaic
SWOT	Strengths Weaknesses Opportunities Threats
REAP	Resource Efficiency in Architecture and Planning
RES	Renewable Energy Source
UN	United Nations

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IN COOPERATION WITH

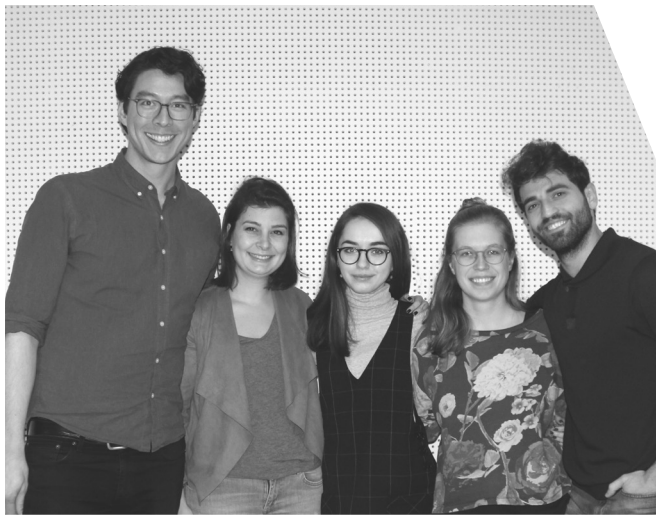
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BIOWASTE MGT. TECHNOLOGY

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FIGURE 1 - 10th Generation REAP (Young, 2019)

FOREWORD

The REAP (Resource Efficiency in Architecture and Planning) Master’s Program is a multi-disciplinary 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 varying scales and in different cultural, geographical and societal contexts. By following an integrative and multi-dimensional approach to real-world applications, the REAP program offers students opportunities to approach the challenges of today with realistic recommendations and solutions supported by faculty with an extensive background in the field of sustainability at both the technical and political levels.

The program is centered around three core projects at different scales: the city, the neighborhood, and the building. This brochure highlights the works of the 10th generation REAP students’ Project III, in the context of the Urban Regeneration of Large Housing Estates Post-Socialism in Niš, Serbia.

The Projects and Essays on the following pages aim to give the reader an understanding of the challenges and opportunities in housing that arose from the post-socialist transition period in the city of Niš, Serbia. Thank you for reading.



Niš, Serbia: Students from HCU REAP and University of Niš. (Haveriku, 2019)



Hamburg, Germany: Students from HCU REAP and University of Niš. (Haveriku, 2019)

INTRODUCTION

FIGURE 2 - Prefabricated panel construction in Krive Livade (Tacke, 2019)

by Julian Tacke

In cities throughout Europe, the growing demand for housing due to increasing urbanization processes was met with the construction of large housing estates (LHEs) from the late 1960s onwards. This simple prefabricated construction method, often accompanied by many extra storeys, provided a large number of residential units with comparatively short construction times and a low cost to floor area. Depending on the diversity of the inhabitants and the political conditions of the respective country, LHEs have shaped neighborhood relationships in completely different ways. Correspondingly, varying realities of life have also shaped the public perception of these residential areas over time.

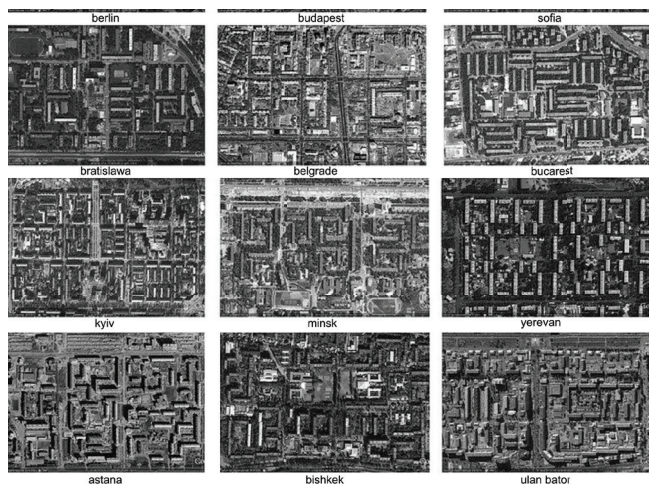


FIGURE 3 - Large Housing Estates in Europe and Asia (Scholman, 2020)

This joint research project between HafenCity University and the Technical University of Niš explored similarities and differences between LHEs in the two cities. In comparison with Hamburg, fundamental differences in Niš result primarily from the socialist-oriented planning and construction phase and the political developments of the post-socialist era in Serbia. The effects on the building fabric, public spaces, resident structure and ownership represent both challenges and opportunities for the neighborhoods in both Hamburg and Niš.

On this basis, urban interventions for the Krive Livade district in Niš were designed to initiate a renewal process for the aging housing estates. Thanks to close cooperation with local researchers and comprehensive analysis of local conditions, projects were developed that built on the specific characteristics of the district. From the management of the public spaces to the activation of the local population and the supply of renewable energy systems, all these projects take up different aspects of urbanism - in order to use them as a basis for improving the quality of life for the local inhabitants of Niš. The focal points are based on the five central components of the master program “Resource Efficiency in Architecture and Planning” (REAP): Climate and Energy, Materials and Waste, Water, Energy Efficiency and Governance. The diverse cultural imprints and professional backgrounds within all five project groups have particularly contributed to the fact that numerous perspectives are taken into account when developing the interventions.

On the following pages, the different projects are presented in a condensed and easily digestible form. The insights the projects are based on and the designs themselves, can serve as an inspiration for urban regeneration projects in LHEs in the Balkan region and beyond. Although all projects are tailored to the characteristics of Krive Livade, they have been developed with the explicit aim of serving as blueprints for projects in similar urban environments.

Together with the summarized project reports, this publication also contains more in-depth background information on the explicit focus topics in the context of Urban Regeneration of Large Housing Estates in post-socialist Serbia.



CONTEXT

FIGURE 4 - Skyline of Bulevar Nemanjića (Bojan Lazarevic, 2008)

SERBIA

by Camila Afanador

The following projects were developed in the context of the city of Niš in Serbia, a region that has long been the center of worldwide conflict, resulting in its present social and cultural structures. Serbia is located in the Balkan region in the southeast of the European continent. After the first world war, the territory along with its current neighboring countries of Croatia, Slovenia, Macedonia as well as Bosnia and Herzegovina became part of Yugoslavia, a nation in itself ruled by a monarchy. After the Second World War, Yugoslavia briefly fell into the orbit of the Soviet Union and became The League of Communists of Yugoslavia, however they distanced themselves from the Soviets in 1948 under the leadership of Josip Broz Tito. During the crisis of 1980, conflicts started growing within this territory and ended in a series of wars resulting in independent countries in 1991. In the context of the cold war and with the weakening of the communist states, Serbia had to face an immense transformation both politically and economically.

Currently, Serbia is a parliamentary republic with around 7 million inhabitants. Belgrade, the capital city of Serbia has 1.3 million inhabitants, followed by smaller cities such as Novi Sad with 277 thousand inhabitants, and Niš



FIGURE 5 - Location of Serbia and main cities (Afanador, 2020, based on Wikipedia, 2011)

with 260 thousand inhabitants (Sousa, 2017). The city of interest for this project is Niš, where the traces of history have determined the cultural and structural development of the city.

NIŠ

Between 1960 and 1990, Niš went through an accelerated industrialization process that increased the population. 70% of the current city structures were built at this time: the district of Krive Livade and the Bulevar Nemanjića were planned and built as part of the infrastructure provided by the Soviet government. The District reflected the socialist principles of equality and collectivism by utilizing large open spaces surrounded by apartment blocks which were built of prefabricated construction panels. After the political crisis, a decay of the economy and physical structures in the city occurred. Soon, the industry diminished and the conditions worsened making Niš the capital of a region with a weak economy and high unemployment rates (Vranic et al., 2014).

Therefore, the city of Niš is an intriguing site for the discovery of the potential of the Balkan's storied history and culture for the daily life of the inhabitants in the district of Krive Livade.



FIGURE 6 - Study area. Krive Livade in Niš. (Afanador, 2020, based on Google Earth)



Photo taken by Jonathan Young (2019)



REAP SCOPES
// ENERGY
// MATERIALS & WASTE
// WATER
// ENERGY EFFICIENCY
// GOVERNANCE

ENERGY

FIGURE 7 - Electricity supply lines in Niš (Heinemann, 2019)

FACTS AND FIGURES

by *Diego Robles & Kirya Heinemann*

The energy sector in Serbia has historically been attached to power and heating generation from coal, natural gas, with a small share sourced from renewable energy. In 2016, the Republic of Serbia was still largely dependent on fossil fuels for energy production (Figure 8): according to the Statistical Report for this country (2019b), around 67 percent of the total energy was produced from coal sources, while oil and natural gas held some ten and four percent of the share, respectively. In that year renewable energies were mainly represented by hydropower, which historically has been an important source of energy for Serbia. For the electricity mix, coal-power generation accounted for the highest share, however, hydropower was ranked second, while other renewables contributed, on a smaller scale, to the production of electricity (Statistical Office of the Republic of Serbia, 2019a).

of the residential sector in the city on using firewood as a heating source; this was confirmed during the site visit. Although the district heating of Niš is still in development, the network run by the public company Gradska Toplana, currently supplies heating sourced mostly from natural gas (Gradska Toplana, n.d.). According to the information provided by the utility and the publication of Vranic et al. (2014), the district heating network roughly covered less than 30 percent of the local households as of 2019. Since 2017, the city of Niš created the role of “Energy Manager”, who is in charge of collecting and analyzing energy-related data for the city, as well as preparing energy efficiency programs (City of Niš, n.d.). This position represents an important step towards improving the existent situation of the energy sector in the region, however, it is imperative that policies and regulations are aligned to the sustainability goals. Overall, the status quo of the energy sector in the city of Niš is an interpolation of the current situation in Serbia, with a high reliance on energy production from fossil fuels, specifically from coal — an economically important activity for the country — and future mid-term efforts aim to strengthen this industry by 2030 (Statistical Office of the Republic of Serbia, 2019a) while the high potential of utilizing renewable energies, specifically solar photovoltaics is yet to be developed (City of Niš, 2014). Additionally, observations made during the site visit in Niš pointed out the potential existence of irregular electricity connections from the public network into households, including LHEs. It is imperative that these situations taking place at the institutional and at the household level are addressed by authorities, in order to create a transparent and sustainable environment for the energy industry in this country.

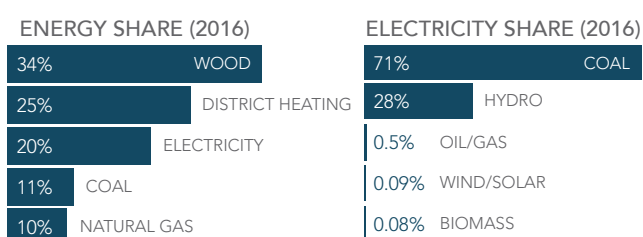


FIGURE 8 - Shares of energy types in the energy and electricity mix in Niš in 2016 (Robles, 2019)

The residential sector in Serbia is the largest consumer of energy in the country (Statistical Office of the Republic of Serbia, 2019a), accounting for nearly 42 percent of the energy consumption (European Environment Agency, 2020). In the specific context of the city of Niš, as of 2010, the largest share of the energy consumed in individual and collective households was allocated in electricity, while heating (from the district heating network (or firewood) was ranked second (Vranic et al, 2014). The described situation points out the existing large reliance

MATERIALS AND WASTE



FIGURE 9 - Waste bins in residential areas of Krive Livade (Velankar, 2019)

THE STATUS QUO OF WASTE

by Maria Moleiro

The current situation of waste management in Niš derives from greater regional and country-scale conflicts, in matters related to planning, mobility, infrastructure and political will. According to the Statistical Office of the Republic of Serbia (2020b), under their chapter related to the Sustainable Development Goals in the context of the country's performance; it can be seen specifically on the Goal 12 concerning 'Responsible Consumption and Production', that Serbia has only achieved one of the 13 indicators for this goal. This is also reflected on the information reported by the European Environment Agency (EEA, 2019a) where despite the country's effort to implement the necessary legal framework in matters of waste management, these are still ongoing and not yet close to fulfilling the requirements to comply with the EU regulations to be a member country. In this report, the clear objectives set by the Serbian Central Government are evident when it comes to the lagging problem of waste, but the challenges are nevertheless of significant pressure.

According to the EEA (2019a), only 14% of municipal solid waste or MSW is being recycled. In general, the main challenges Serbian cities face in regards to material and waste management are collection points being poorly organized and landfills not properly controlled, while



FIGURE 10 - Informal waste collector in Niš (Alves, 2019)

some don't comply with basic operational standards. Today, 30% of MSW ends up in illegal dumpsites (EEA, 2019a). In addition, organic waste ranks as one of the highest waste production shares with the lowest recycling rate; and population awareness on environmental topics is lower than expected to address this issue. This is of great concern in the specific context of Niš, where the studied neighborhood of Krive Livade is mostly characterized by residential activity. It is understandable how these challenges carry a heavy burden on local communities and at the same time are generated by societal behaviour.

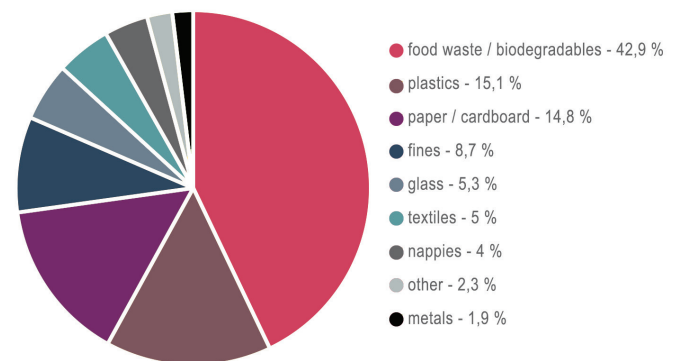


FIGURE 11 - Municipal solid waste composition in Serbia (Moleiro, 2020)

On the other hand, some quantifiable data from the existing challenges pose a great potential to contribute back into the urban transformation of Serbian cities, such as the high share of food/biodegradable waste representing 42,9% (Figure 11) of MSW, or construction waste within the city which could largely reduce emissions when better handled. It has been argued that remarkable energy savings can be achieved when proper attention is dedicated to finding a balance between the generation, use and disposal of materials (Nedić et al., 2013). contributing to important reductions in matters of pollution and landfill space.

WATER



FIGURE 12 - Nišava River (Reyes, 2019)

WATER RESOURCES

by Carolina Reyes

In Serbia, most water resources originate from surface water sources such as large rivers - Danube, the Tisa, and the Sava. Among them, 10 small rivers and 13 underground water sources represent 90% of all surface water adding to a total of 4790 mm³/a gross freshwater (Statistical Office Republic of Serbia, 2018). Most of the country, approximately 92%, is situated in the Black Sea basin - the Danube River Basin. The Danube River is one among the larger rivers in the world and the second largest in Europe.

WATER SECTOR

In the Serbian government, five ministries regulate and constitute the water sector: the Ministry of Agriculture and Environmental Protection, the Ministry of Construction, Transport and Infrastructure (a department responsible for the supervision of water inspection), the Ministry of Public Administration and Local Autonomy, the Ministry of Finance as well as the Ministry of Health (controls the quality of drinking water) (World Bank Group & IAWD, 2015).

Water supply in Niš is realized over a supply network reaching around 43,514 km in pipe length. One main issue concerning this infrastructure is the loss of water due to leakages caused by a lack of maintenance. Thereby, 236 mm³/a of water is being lost along piping networks during the transportation process. The water that reaches the consumer adds up to 4554 mm³/a. Of this, households account for 317 mm³/a, while manufacturing accounts for 128 mm³/a - Electricity with 3886 mm³/a holds the largest share. In 2011, a total of 2,487,886 households or 86.9% of the total population was connected to the water supply system and 62.2% was connected to the sewage system (Statistical Office of the Republic of Serbia, 2018). According to a research data gathered in 2009, just 73% of the population receive water which is safe to drink (Batut,

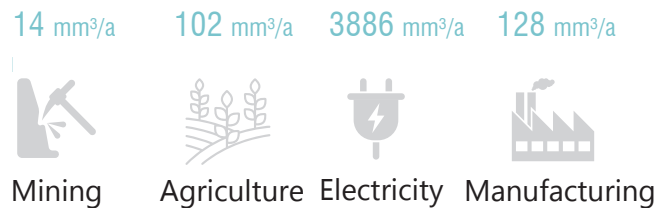


FIGURE 13 - Annual water consumption by sector (Barabas, 2020)

2009). For this reason, the satisfaction with drinking water supply was evaluated as poor - as shown by a survey performed with the population in Niš where only 51% of the residents stated satisfaction with the service (Statistical Office of the Republic of Serbia, 2018).

Another major issue in Serbia is water pollution. Solely, 8% of the wastewater can be treated, since no more than 6 out of 44 existing treatment plants are currently in operation. Furthermore, only 50% of the industrial plants in Serbia treat the produced wastewater, due to a lack of a proper infrastructure to connect the other half to the treatment facilities. Hence, most of the untreated water ends up in the Danube River. Serbia results in being one of the least developed countries in Europe due to this poor utility service. In order for Serbia to become part of the EU and align with the environmental standard, 320 wastewater treatment facilities need to be built (Embassy of Belgium, 2017).

To achieve a transformation into a more sustainable water management, the city of Niš and Serbia in general, have to address the above mentioned factors to be able to provide their residents with the needed quality and quantity of water and protect the natural environment at large.

ENERGY EFFICIENCY

FIGURE 15 - Energy Efficiency (Taskiran, 2019)

ENERGY EFFICIENCY IN BUILDINGS

by Elif Taskiran

Energy efficiency became a major concern of the Serbian Government especially after the EU accession processes started in 2009. Since then, Serbia started to set several strategies and legal frameworks to tackle existing problems regarding improvements of energy efficiency measures. According to the German Corporation for International Cooperation (GIZ), in relation to the gross domestic product (GDP), Serbia was using six times more energy than Germany in their buildings, accounting for a significant share of the energy consumption (2015). In 2018, the share of energy consumed among the sectors was divided as follows: 46% buildings, 27% industry, 27% transport. Moreover, within the building sector, 60% of the total energy was used by residential buildings only (Durić et al., 2019).

The reasons behind this high energy consumption rate within the residential buildings could be clustered into 2 main categories: as 1) poorly designed and constantly aging building envelopes and 2) usage of energy inefficient systems for heating, cooling and lighting for the buildings (Figure 16). In Serbia, more than 80% of the dwellings were constructed before 1981. The large housing blocks constructed in the seventies and eighties show especially

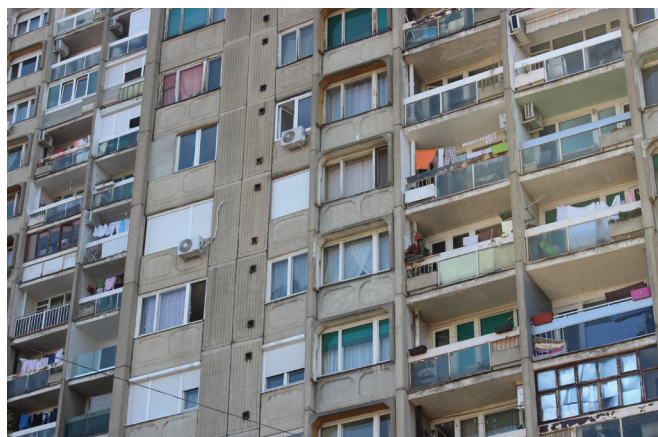


FIGURE 16 - Facade with AC units (Taskiran, 2019)

excessive energy demands for heating and cooling due to the low thermal performance of their envelope (Todorović, 2010). After the collapse of Socialism in the 1990s, due to heavy migration to the urban areas, there was an urgent need for mass housing constructions. This need led to an extensive application of prefabricated construction techniques which are characterized by fast and modular, yet low energy-efficient developments (Alfirevic & Simonovic Alfirevic, 2015) that lack proper insulation on the building envelope (GIZ, n.d.).



FIGURE 17 - New building constructions (Poci, 2020)

As the effect is coupled with outdated heating, air conditioning and hot water systems, it results in an overall high energy consumption (GIZ, n.d.). Under these conditions, an average household in Serbia consumes 150 kWh/m² per year for heating, cooling, hot water and lighting which is more than two times higher than EU average (Durić et al., 2019). However, with the implementation of several tools such as energy certification systems (Serbia Energy, 2013) and the creation of national energy efficiency action plans (Todorović, 2010) in a bid to meet the requirements to join the EU, the government has been working on setting standards for the energy performance improvements on not only new constructions but also the refurbishment of the existing housing stock.

GOVERNANCE

FIGURE 18 - House of the National Assembly of Serbia

HISTORY

by Rihab Hlel & Priyanka Kudige Prakash

Serbia was under the rule of the Ottoman Empire from the 15th to 18th centuries. The country got its independence in 1878 whereafter, from 1945 until the 1990s Yugoslav war, Slovenia, Macedonia, Croatia, Bosnia, Montenegro & Serbia were members of the Socialist Federal Republic of Yugoslavia (BBC News, 2018). Later Serbia formed a union with Montenegro, however, the union was peacefully dissolved in 2006 with Serbia reestablishing its independence in the same year (BBC News, 2018).

THE GOVERNMENT

The government in Serbia is a parliamentary republic with the Prime Minister as the head of the government. The country's Constitution was adopted in the year 2006 (BTI, 2018).

The government is sub-divided into 3 branches: the Executive branch, the Legislative branch and the Judiciary. Executive power is exercised by the Prime Minister while the President represents the state within the country and at a global level. The legislative powers are exercised by a unicameral parliament known as the national assembly, which is composed of 250 elected deputies (BTI, 2018). The National Assembly is responsible for enacting laws, approving budgets, scheduling a presidential election, approving cabinet nominees, selecting and dismissing the prime minister and ministers, declaring war against an external enemy, and ratifying international treaties and agreements. The Judiciary consists of constitutional and other common courts, of which, the Supreme court holds the place of the highest court in the country and the last court for any appeal.

LARGE HOUSING ESTATES

Large housing estates were planned and constructed as massive urban extensions following the Congrès International d'Architecture Moderne (CIAM) principles of urban planning during the 1960s, and were largely served by a modest degree of urban services. These services were based on integrated planning and the consideration of the public interest. In 1989, the collapse of Socialism resulted in changes in the economic and political aspects of the country. New housing policies brought privatization of LHEs and a top-down approach without strategic planning and with a higher emphasis on private interests was utilized in this era (Peric, 2017).

MUNICIPALITIES

Serbia has a total of 29 cities and 174 municipalities, all of which form the basis for the local government. While six of these cities are city municipalities (City Population, 2020), the administrative territory of Niš in itself includes five city municipalities (Medijana, Pantelej, Palilula, Crveni, Krst and Niska Banja), despite the absence of a local government status. Each city municipality has its own administration which performs tasks at local government levels, as allowed for by the City of Niš.



FIGURE 19 - Last presidents of the republic of Serbia



Photo taken by Jonathan Young (2019)



PROJECT PROPOSALS

- // LIFE IN BETWEEN
- // BRINGING COLOR TO GREY
- // POWER 2 PEOPLE
- // NICHES2NIŠ
- // ZIPPING THE GAP
- // BIOWASTE MGT. TECHNOLOGY

LIFE IN BETWEEN

CONTEXT

INTRODUCTION

Bulevar Nemanjića is located on the east side of the historic city center of Niš. It is one of the central neighborhoods of Medijana Municipality bordered to the south by the boulevard itself and to the north by the Nišava River. The area mostly consists of multistorey residential blocks (LHEs), constructed during the socialist era. After the fall of socialism, the area started to be challenged by various socio-economic parameters which resulted in overall neighbourhood degradation and a decrease of well-being among its inhabitants (L. Vasilevska et al., 2013).

Aging housing stock and neglected open space could be addressed as two of the largest challenges that have a major impact on the entire Bulevar Nemanjića area. The area has been divided into five sub-units (Figure 20) depending on their local features and current problems. For 'Life in Between', area 1 was selected as a focus site due to its critical location and representative characteristics. As it is the closest part of the boulevard both to the river side and to the city center, this sub-unit carries a high potential for improving the connection of the neighborhood to its surroundings.



FIGURE 20 - Project Area

SITE INVESTIGATION

During the site visit the main problems of the site were identified while reflecting on outcomes of the literature research as well as the key findings of the interviews. As represented by pictures taken during the site visits (Figures 21 & 22), the area reflects the results of LHEs development over the years which are strongly related to underutilised open space and neglected buildings.

There were several examples of garages turned into retail shops (also known as garage capitalism), deserted pocket-parks between the LHEs and degrading building facades with altered balconies. At eye level, the open space was heavily dominated by irregular and illegally parked cars (Figure 23). Other than that, the open space was under poor condition and equipped with nonfunctional bike lanes, damaged urban furniture and surrounded by vandalized walls and unused garage spaces (see figure 02). The following statements of residents support the first impressions of the neighborhood:

"Nobody takes care of the shared spaces."

"People park anywhere."

"There are so many unused spaces."



FIGURE 21 - Underutilization of Garages (Young, 2019)



FIGURE 22 - Facade of LHEs in Krive Livade (Young, 2019)

ANALYSIS

REAP CLUSTERING

As a result of the site investigation, observed problems of the site are clustered in six categories as follows: issues related to open spaces, mobility, buildings, infrastructure and socio-economic-political factors.

OPEN SPACE

Neglected and misused // Poor lighting // Lack of activities // Occupied by cars // Aged playgrounds // Lack of pride

MOBILITY

Not pedestrian friendly // Poor bike infrastructure // Car-oriented area // Few public transport stations

BUILDINGS

Neglected facades // Garages on ground floor misused or unused // Balconies often closed // Energy inefficient // Infill-development // Illegal add-ons

INFRASTRUCTURE

Poor quality of sidewalks // Few crossings

SOCIO-ECONOMIC-POLITICAL FACTORS

Insufficient policies // Lack of investments // Lack of social activities // Lack of trust in the government



FIGURE 23 - Misuse of Open Space (Young, 2019)

RESEARCH QUESTION

In order to address these issues, the following research questions were formed:

How can we better utilise shared open and semi-open spaces to improve the quality of community life through a participatory and inclusive process?

SUBQUESTION 1

How can Garage Capitalism 2.0 be implemented to attract more users, increase community engagement and stimulate economic growth?

SUBQUESTION 2

What interventions could improve the quality and use of the open space for all users to promote and sustain a vivid and lively community?

DETAILED ANALYSES

Once the research questions were formulated, series of in-depth analyses were undertaken, including: map analyses, SWOT, LOGframe, stakeholder analysis, case studies, interviews, literature research and a problem and objective tree analysis. These analyses were both qualitative and quantitative in nature, and provided an in-depth impression of the strengths and weaknesses of the neighborhood, as well as how our project proposal would take advantage of opportunities and address the inherent risks and threats. The key findings of these analyses, which can be found in the next section, provided support to shape the vision of how a garage capitalism 2.0 concept, as well as an inclusive and participatory process, could improve the neighborhood's quality of open space and community life in a variety of ways.



KEY FINDINGS

Site investigation and further detailed analyses enable us to understand the current situation in the project area.

One of the remarkable points within the district is the existence of sufficient open space. However, at present, it is not used actively by the residents since it is not well maintained, so that it is not attractive for the inhabitants to spend their leisure times or to have social activities in these spaces. Moreover, accessibility to the shared places is limited due to irregular car parking. On the other side, redesigning of the garages to run them as shops is a crucial point to revive economic activities in the area and to decrease unemployment. Nevertheless, there are still several unused and inactive garages that have potential to make spaces more attractive at eye level, and to enhance community engagement in this way.

Considering these points, the project 'Life in Between' intends to focus on the revitalization of the open spaces and improvement of the garage capitalism concept. At this point, the issue of lack of money at both the level of public and government is taken into account to come up with a realistic approach to proposals. Furthermore, the engagement of all stakeholders is a significant approach to create effective and affordable projects. Additionally, the project group observed that community engagement, which is important in the participation process, is missing in local activities and developments due to the historical background of the city of Niš. Therefore, community participation is considered as an essential element as well. Consequently, key points of the investigations are defined as revitalization of the open spaces and the improvement of garage capitalism to enhance communal life in shared and semi-open spaces through sustainable and site-specific interventions.

CONCEPT

CONCEPT DEVELOPMENT

Thus, by developing a new concept related to these parameters, it is aimed to enable the life in between the chosen LHEs. The main idea of the project concept is to reactivate garage capitalism and revitalize shared open spaces at the same time through community-led projects to convert the underutilized shared spaces into a lively corridor which could not only add activity and vibrancy to underutilized spaces between the LHEs, but also potentially serve to draw the inhabitants from the area to the riverside, and improve the connection to the city center through transformed and accessible pathways and biodiversity corridors once the proposed projects are realized.

For this purpose, regarding garage capitalism, it was decided to create a long term development strategy which responds to the needs of inhabitants with a more inclusive garage capitalism concept. Furthermore, for the open space, it is planned to enhance the service infrastructure and propose new space use functions while turning the area into a more resilient and healthy environment through various interventions led by the community members which will be further detailed in the next sections.



FIGURE 24 - Project Vision



FIGURE 26 - Facade of a LHE in Krive Livade (Young, 2019)

SUSTAINABILITY ASPECTS

Aiming to achieve more resource efficient and climate responsive solutions for the regeneration of the project site, sustainability lies at the heart of this concept development. By our definition and others in the field, sustainability encompasses social, environmental and economic aspects. Respectively, in this project, it was decided to touch upon these criterias especially by focusing on water, sustainable urbanism, mobility and materials related interventions.

In the initial phase of this proposal, a few minor and cost effective interventions will take place, such as placing car barriers, properly connecting drain pipes and performing site analyses and planning schematics for more ambitious interventions to be performed at a later stage with the assistance of the community members. The objective is not to have a top-down approach to the community by telling them what to do, rather to make proposals that illustrate what the benefits of such interventions could be (Figure 24), and allow the residents to decide which projects they would like to carry out. This will ensure a long lasting sustainability of the project.

PROJECT DETAILS

The project has a two year timeline with the involvement of the project group, where the community center/project office launch the App and the project team process will be established. After these two years, the project office will be handed over to a multi-disciplinary team of local inhabitants to maintain and further develop.

The Garage Capitalism 2.0 concept and App (Figure 25) will be run by the project office, and used as a source of income for the project office, as well as a platform for entrepreneurship and revenue generation within the community.

Both the project office and the App will play an important role in the risk mitigation and ultimate success of the project, both as a means of monitoring and a tool for engagement. The App will serve as a vital means of local communication with various stakeholders and decision makers. It will serve as a platform to post events, an online marketplace, garage rental (GC 2.0) platform, a place to join local groups, complete projects and post questions and comments to the community board (Figure 25). For instance, it is possible to start up a project and invite other residents to execute it together. This functionality will lead people to design both the open spaces and semi-open garages by themselves in a social and affordable way, while also helping the local government to manage and be aware of these projects.

Through the establishment of both physical and virtual community platforms, these interventions have a potential lasting and sustainable impact on the community's well-being by increasing community engagement, adding income streams and connecting stakeholders and decision makers.

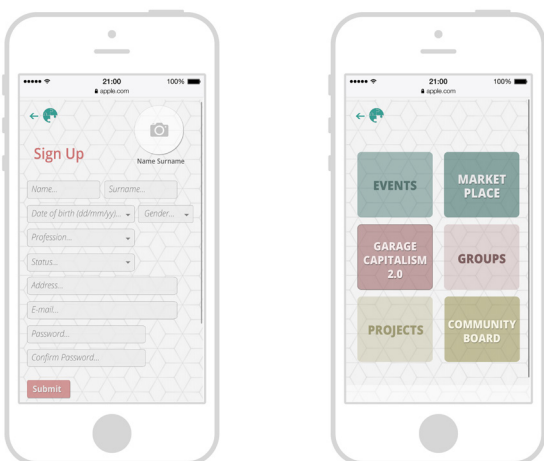


FIGURE 25 - App Functionality, Profile Page and Options



BRINGING COLOR TO GREY

FIGURE 27 - Side View onto the Boško Buha Local Market (Heinemann, 2019)

BOŠKO BUHA MARKET

INTRODUCTION

The Bulevar Nemanjića LHEs were built over the course of the 1970s and 1980s and currently has approximately 40 thousand inhabitants in 94 hectares, resulting in a high-density population area (Dekic, 2019). The neighborhood is mainly residential, with service units such as kindergarten, school, community center, health center and a recreational area. Around 1990, a growth in urban migration was noted, which culminated with a transitional urban development at Bulevard Nemanjića; building upgrades, multi-story housing extensions (MSEs), infill developments and the process of garage capitalism. The last two played an important role in Krive Livade's greenery and open space quantity and quality, as the population has risen, the housing demand similarly increased, and open/green spaces are being transformed into new residential buildings. Moreover, garage capitalism has reduced the availability of parking spaces, which has forced inhabitants to use curbsides, green spaces and even pedestrian walk paths, with these areas each losing capacity as a result. The main characteristic of the neighborhood is the presence of a large share of LHE residential buildings. These high-rise constructions were constructed as part of public work programs which represented a symbol of equality during the socialist period and helped to create a communality bond in the area (M. Vasilevska et. al, 2016). Currently, the Saint Sava Park offers day and nightlife for the district as well as for the entire city. The park offers leisure, religious, gastronomic and social interaction opportunities for all age groups. It is framed by the surrounding buildings, creating a place that belongs to the Boulevard as well as to the city of Niš, embracing visitors from anywhere (Lerner, 2014). During the site visit, the authors observed that the LHEs displayed predominantly grey colored facades,

which in addition to its prefabricated nature and repetitive styles around the neighborhood, created a monotonous atmosphere. Later, interviews with the inhabitants of the region were conducted, and an opposite layer was found. The community has a strong bond with the district and revealed the livability within the grey spaces. The most important bonds to the community are family, friends, the St. Sava Park and the Boško Buha market.

FOCUS

The Krive Livade local market, denominated Boško Buha, founded in 1970 and located on the Bulevar Nemanjića, contributes to the identity of the neighborhood. This market has over 7000 square meters and almost 570 counters, being the second-largest market in Niš, selling agricultural products, clothing, textiles and other commodities (City of Niš, 2018; JKP Tržnica Niš, n.d.).

“Why does a market attract so many people? There are many explanations: people like to watch people; the market is as old as the city itself; people like to see other people doing the same thing they are; and people like to see food, its preparation, its care. [...] we feel nostalgic when we see products [...] in their natural state.”

(Lerner, 2014)

The core issues delve into four areas – Visibility, connectivity, flooring and layout. Visibility is a crucial part of urban design and the volume of buildings dramatically influence or damage a natural landscape (Tong et al., 2016; Hernández et al., 2004). The large housing estates and privately-owned dwelling units coexist with height variances from a single-story dwelling up to a fourteen-story block visually altering a street perspective as opposed to a bird's eye view. Vehicular connectivity is



FIGURE 28 - Improvised Flooring and Roofing Inside the Market (Heinemann, 2019)



FIGURE 29 - Vending stands of Boško Buha Local Market (Heinemann, 2019)

14 nodes/km² with a cyclomatic number of 10 and an average distance of 138 meters between intersections. Pedestrian connectivity is 36 nodes/km² with a cyclomatic number of 20 and an average distance of 95 meters between intersections. These figures indicate poor market connectivity. Improving vehicular connectivity is out of scope for this project while new pedestrian entrances are expected to encourage more pedestrians. The flooring of public spaces has a major impact on multiple factors - environmental processes like surface-runoff or microclimate, social aspects like the inclusiveness of a space or walkability and aesthetic appeal or architectural value. Materials used inside the market area were chosen to be impermeable. These are often makeshift, uneven and devoid of colors or patterns, aspects that otherwise provide a simple solution for natural guidance of users. In a Canadian study, nine out of 12 market owners preferred an actively planned market layout with adequate vendor placement and mix inside different areas alongside an information booth to promote events (Alberta City, 2016). In contrast, Boško Buha is unorganized with a random arrangement of stands and no clear visible entrance. On further analysis, a clear separation between vegetable, clothing and plastics stands can be observed. While plastics hold the least share and are at the back of the market (considering the Boulevard as the main front),



FIGURE 30 - Market Location and current Vendor Stand Arrangement (Bais, 2019)

vegetables holding a considerably larger share are also placed at the rear and have the highest visitor turnover. The frontage serves as the clothing area with the least visitors. Thus, the core focus of 'Bringing Color to Grey' is the revitalization of the Boško Buha market by developing a replicable local market model, creating a cultural center point for the community and boosting the local economy. These strategies are achieved by enhancing the market's visibility, renewing the structure, reorganizing the space, reducing the environment footprint, creating a market identity and organizing events.

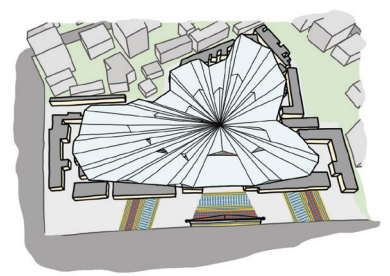
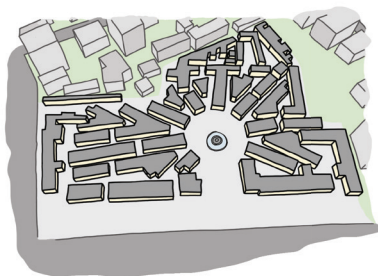
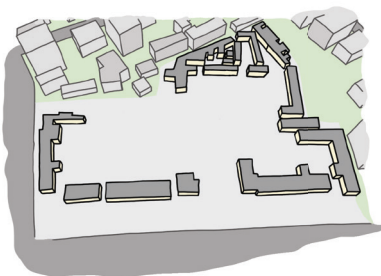


FIGURE 31 - Demolition and Reconstruction Process during the Project Realization (Bais, 2020)

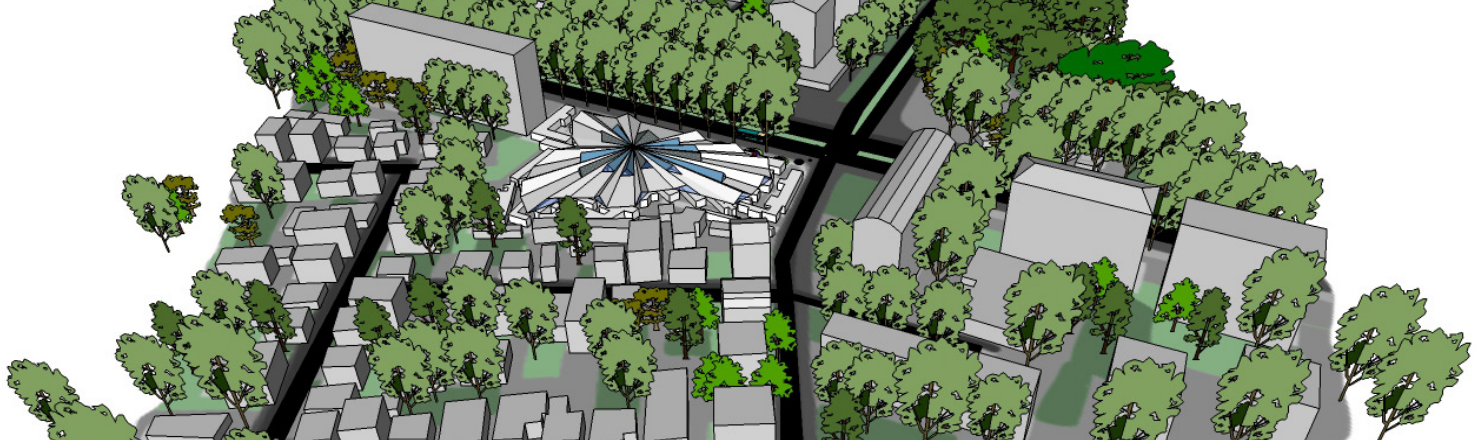


FIGURE 32 - Vision of the renovated Boško Buha Local Market (Alves, 2020)

IMPLEMENTATION

The proposal addresses the need to alter perceptions of the market by redeveloping the floor plan and adding a new roof to allow for further planned circular, environmental and social concepts. The two fundamental actions intend to create a physical space that can serve as a platform to engage multiple actors and develop practical solutions for market clientele. The metal, wood, brick and concrete waste from deconstruction activities (planned to take one year) will be reused for benches, new counters and signposting. Textile waste generated from the high presence of textile vendors will be channeled to the “Let’s Zip the Gap” initiative which aims to create recreational and educational spaces through the implementation of seaming workshops, hosted in the marketplace as part of this cooperation. Collected bio-waste will be used for electricity generation and manure will be sold to farmers to create a circular economy loop (OECD, 2007). By implementing such models, it is possible to improve the circular flow and local urbanism, having a positive impact on the environmental footprint and creating opportunities for inhabitants of Bulevar Nemanjića. To allow for a holistic approach the plan respects its neighborhood context, creates a positive perception of the market, allows for socially accessible space, visually enhances the surroundings and makes the infrastructure functional. (Carmona et al., 2003). The central plaza functions as a spatial and social focal point for visitors where various activities and events can be organized throughout the year to activate the space and attract additional visitors. Serbian music played in the market background (Wednesdays from 11 am to 2 pm) and a monthly event with a local musician (from 3 pm to 5 pm) is intended to benefit the community. Neighboring institutions like local youth clubs and universities, can gradually be invited to encourage

public dialogue and interaction. High-power and high-interest stakeholders like the Public Utility Company (owner of the Boško Buha market) and the City of Niš will be managed closely throughout the transition process to ensure the implementation of common goals and benefit the entire community.

FEASIBILITY ANALYSIS

In terms of a project, certain conditions are necessary to be met for it to be carried out successfully within a scheduled timeframe. The project relies on the injection of funds or private investments. BTI (2018), on its Transformation Index for Serbia, described the governance in the country as inefficient with its resources (as processes) being described as slow, bureaucratic and time-consuming - the relation between the number of resources put in place and the results obtained is poor. The new market intends to create an environmentally and culturally conscious space for the inhabitants of Medijana while ensuring the proposed features are technically viable, cost-effective and beneficial. As the project aims to connect the neighborhood and enhance public participation, reforms to existing legal frameworks need to be implemented, to reduce the impact of the ‘democratic deficit’ of post-socialist societies. According to Transparency International e.V. (2019), Serbia accounted for a Corruption Perception Index of 39 out of 100 in 2018 and placed 87th worldwide (among the lowest in Europe) - a reflection of the lack of trust from citizens in the public institutions. This should be overcome to deliver a transparent, well-managed project that satisfies the population. In summary, the complete engagement of different stakeholders is crucial in the feasibility of this project and is needed to avoid conflict of interests, disagreements that might result in delays, or other unforeseen interruptions in the project’s schedule.

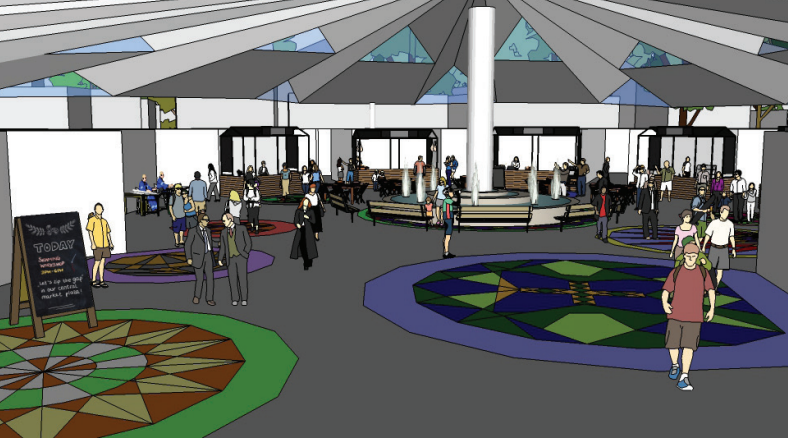


FIGURE 33 - Vision of the Central Plaza (Aringueri & Alves, 2020)

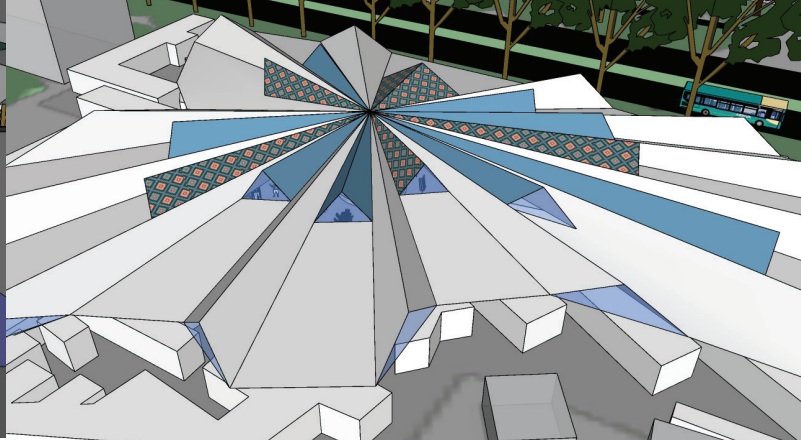


FIGURE 34 - Vision of the Roof Structure (Alves & Aringueri, 2020)

SUSTAINABILITY ANALYSIS

To understand the impact of the project on sustainability, the cause/effect relationship of interventions related to management, physical structures and social changes were analyzed. In the first step, the alterations in the management of the market (for instance a participatory approach) result in an enhanced social environment described by security, integration and community, while establishing a trade agreement with farmers. The next step highlights the impact of physical structures on the overall sustainability emphasizing the importance of a visual upgrading of the market space. The most impactful alterations are the roof, the plaza as well as the open entrance counting for multiple positive effects. The effects that are mainly targeted by the change of physical structures are visibility, walkability, an efficient space use, a reduced electricity consumption, enhanced water infiltration, a circular economy approach on waste management, rain water harvesting, as well as the feeling of integration and community. Thirdly, the implementation of social life in the market is considered crucial to creating a meeting point which offers tradition and events and functions inclusively for all inhabitants of the neighborhood. The cause-effect relationships established in the project clarify the dependency of sustainability in the Boško Buha market from the proposed interventions. It can be understood that alterations targeting management, physicality and social life are essential to achieve an enhancement of sustainable space.

CONCLUSION

Post-socialist Serbia is experiencing a transition period at political, economic and institutional levels. This is reflected in the links through different ties - employment, family, or studies and from these statements, it is possible to infer that the community-building relies upon the bonds of the neighbors. The revitalization of the Boško Buha market aims to play an important role in the strengthening of community involvement and public participation based on observations at the site, as well as additional qualitative and quantitative analysis. The neglect and mismanagement driven by the administration, and lack of policies to regulate informal commerce led to the project's revitalization proposal that includes architectural and operational transformations intending to create a public space with local involvement in the decision-making processes resulting in a cultural symbol for the inhabitants. Limitations include further research on consumer profile and behavior, and the coexistence of a revitalized market with a public-ownership nature. Besides, understanding the existing regulating policies requires additional investigation. Technical and architectural analyses regarding thermal comfort inside the marketplace, microclimate, water infiltration, and renewable electricity are set to be included in complementary studies. The main risk in the success of this proposal is that it relies on a positive reaction from several parties: the owner, the municipality, and society itself. The main stakeholders involved should overcome the obstacles that these types of projects usually face, and that the commitment to sustaining the operation of the market endures in a long-term run. Parallel initiatives complementing this proposal might include educational programs, to raise awareness on topics related to a circular economy, environment, social inclusion, livability, and public participation.

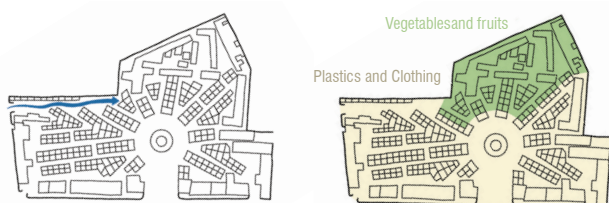


FIGURE 35 - Location of service lane and waste section (left) and sectioning (right)

POWER 2 PEOPLE

PROPOSAL FOR AN ENERGY COMMUNITY IN KRIVE LIVADE

BACKGROUND



FIGURE 37 - Current facade conditions of buildings in Krive Livade.

Historically, lignite has always played a major role in Serbia's electricity supply. To this day, electricity generated from the combustion of lignite accounts for up to 74% of Serbia's energy mix. While hydropower accounted for some 24% of the mix, renewable energies currently still play an insignificant role (Statistical Office of the Republic of Serbia, 2019a). The strong dependence on fossil fuels for energy supply, which also affects the heating sector, has a dramatic impact on the emissions of the national economy. In 2014, every dollar of the Serbian gross domestic product caused approximately 900 g CO₂eq. Compared to the same value in Germany of about 200 g, for example, this value is more than four times higher (The World Bank, n.d.). This fact shows the urgent need for action, but also the great potential in Serbia's energy sector. This will be taken up in the development of the following project and linked with other specific characteristics of the neighbourhood in order to initiate the urban regeneration process on different levels.

The project site of the large housing estate of Krive Livade in Niš has many typical features of comparable neighborhoods in post-socialist countries. Firstly, the socialist principle of equality and planned economy during

the construction period in former Yugoslavia meant that the high-rise buildings with the same floor plans were inhabited by a highly diverse population. In the course of mass privatization after the fall of the Eastern Bloc, the apartments were often transferred to the current residents at nominal prices. The large number of apartment owners combined with the absence or overburdening of urban planning, has led to weak regulations and responsibilities for common spaces and the maintenance of the buildings have been poorly formulated or enforced. As a consequence, the lack of a collective sense of belonging leads to neglect of the buildings and surrounding public spaces.

This project for the predominantly residential area of Krive Livade therefore aims to strengthen the sense of community among its residents by creating a local energy cooperative. With a collective investment, this pilot project aims to stimulate civic commitment to a decentralised energy transition by offering a long-term financial incentive for participation. In particular, a look at the Serbian average income of around 7,000 euro per year (Statistical Office of the Republic of Serbia, 2020a) suggests that climate and environmental protection will only find a broad resonance among the population if they not only do not claim public funds, but even promise financial added value.

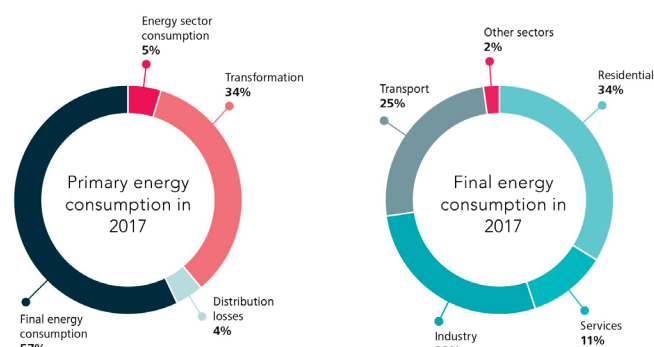


FIGURE 38 - Energy consumption shares in Serbia in 2017.



FIGURE 36 - Selected building after intervention.

CONCEPT

The research question for the project is driven by this insight: How can a RES (Renewable Energy Source) serve as a pilot project to reduce CO₂ emissions and provide an economic opportunity for the community?

To answer this question, a small-scale project site within the neighborhood was selected. Various criteria such as the number of housing units and location played an important role in meeting the basic requirements of a manageable number of inhabitants and sufficient potential for the application of renewable energy systems. An eight-stage energy efficiency concept was then developed for the two selected buildings, located directly adjacent to each other.

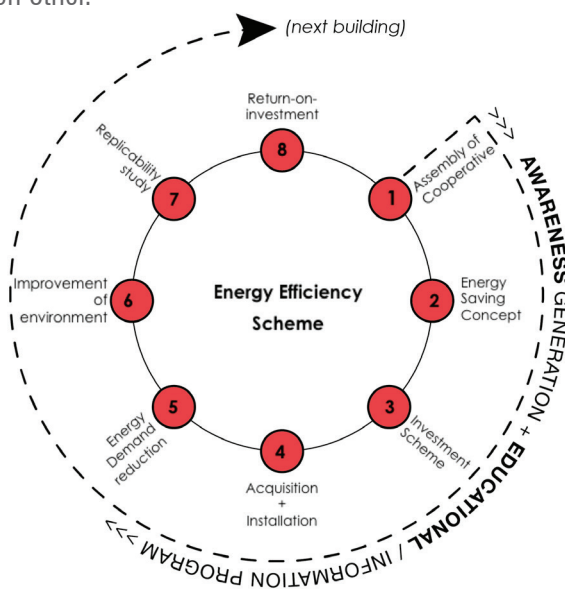


FIGURE 39 - Diagram of proposed Energy Efficiency Scheme.

Many aspects of the project are based on the principles of REScoop, an association of European energy cooperatives, which have compiled their experience into comprehensive best practice reports (REScoop, 2013). Accordingly, the steps mentioned in the designed Energy Efficiency Scheme are planned for the project in Krive Livade (Figure 39).

In view of the individual investment sums, cost efficiency played a major role in the selection of the concrete measures. Consequently, so-called low-risk/high-return solutions were considered, so that the proposal requires as little maintenance as possible.

A comprehensive meteorological analysis of the site, as well as the applicability of microsystems in urban space, has resulted in a combination of two measures. On one hand, it could be determined that the considerable heating requirement in households, of almost 1,100 MWh per year can be reduced significantly by providing insulation of the building envelope (Afanador et al., 2020). This is primarily due to the lack of insulation of the cheap prefabricated construction of the buildings. On the other hand, Serbia's geographical location offers exceptional potential for the use of solar energy through photovoltaic systems. Compared to Hamburg (891 kWh/m² per year), the average annual solar irradiation (direct normal irradiation) in Niš is 1302 kWh/m² per year, which is over 45% higher (Afanador et al., 2020).



FIGURE 40 - Selection of final location site, according to designed criteria.

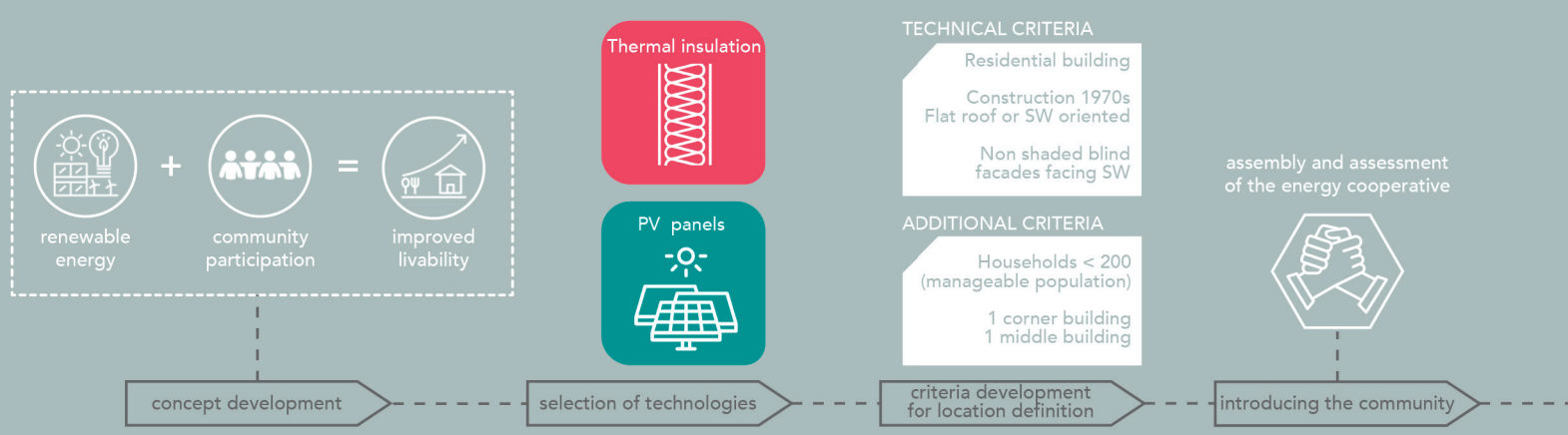


FIGURE 42 - Intervention proposal through Insulation and photovoltaics.

INSULATION

The concrete technical specification of the proposal provides for internal insulation of the façade with an area of 2,500 m² and intermediate ceilings in the building, possibly with rock wool, replacement of all previously single-glazed windows with a total area of also just under 2,500 m² (Afanador et al., 2020). By drastically reducing the heat transfer coefficients of the outer walls of the building, these measures can reduce the heating requirements of both buildings by 66% to just under 370 MWh per year. This energy saving measure has a direct effect on the heating demand and thus on the heating costs. Measured against the total investment of almost 890,000 euros for materials and installation, which — depending on the degree of participation — is spread over up to 91 residential units, this means a refinancing horizon of 24 years, taking into account the current heating costs

of 0.051 euros per kilowatt hour (Afanador et al., 2020). The measure has the potential to save a total of 142 metric tons of CO₂eq per year.

In view of the calculated investment costs, REScoop's recommendations were considered, with a combination of crowdfunding and loans involving ethical banks focusing on long-term and sustainable investments. In addition, participation by international development funds is also conceivable. An additional positive aspect of facade insulation, especially against the background of climate change, which is already increasing the number of heat waves in Serbia during the summer months (REScoop, 2014), is the lower cooling requirement in the summer. As cooling in Krive Livade is mainly done with electric appliances, a reduction in electricity consumption during the summer months is also expected.

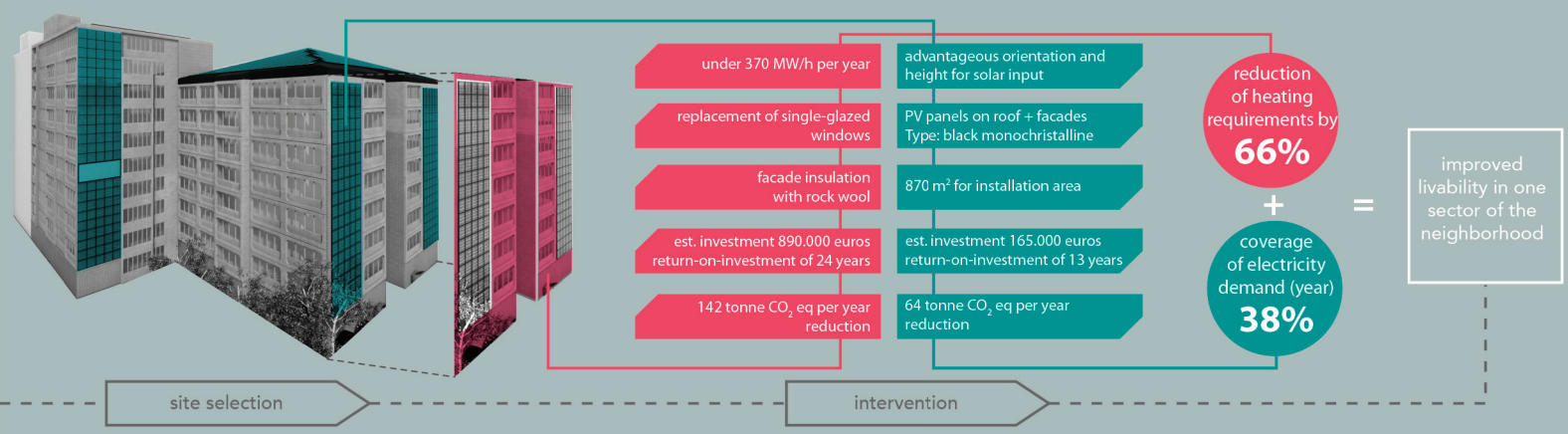


FIGURE 41 - Infographic of proposal development.

PHOTOVOLTAIC

The installation of photovoltaic panels on the roofs and facades of the buildings is the second intervention. The advantageous orientation - high construction, facing southwest - of the buildings allows the installation on a surface of over 870 m² (Afanador et al., 2020). When choosing the cells, it was taken into account their use as a design element depending on the type and color of the cells. In the end, however, monocrystalline cells were chosen because of their reduced reflection, which is an important criterion, especially for the opposite facades of the densely-built Krive Livade. Compared to other renewable energy systems, PV panels are relatively inexpensive and require little maintenance. Furthermore, they do not cause any noise and are therefore ideally suited for small-scale applications in urban areas.

The planned system is able to cover 38% of the total annual electricity demand of the project area. With a grid price of 0.059 euros per kilowatt hour (GlobalPetrolPrices, 2019) and an investment volume of 165,000 euros, the payback period is approximately 13 years (Afanador et al., 2020). The emission saving potential of this measure is 64 metric tons CO₂eq per year, due to the large share of coal in the electricity grid, as mentioned above.

SYNTHESIS

The technologies examined for Krive Livade offer considerable savings potential and are conceivable both individually and as a combined package of measures. While most assumptions for the project are based on the analysis of concrete electricity and heating bills of the residents, data from the European area were used for the material and installation costs due to limited data availability. For example, conservative data from the United Kingdom was regarded for the assumptions on façade

insulation and options from leading German suppliers for the photovoltaic panels (Roof Insulation Info, n.d.).

In both cases, however, priority should be given to the selection of local products for an additional positive effect, or at least local installers and technicians so that other sections of the population can also benefit from the project. In principle, however, the calculations do provide a promising model with which - especially in the case of solar PV - small-scale investments pose significant CO₂ savings within a foreseeable time horizon and at the same time offer financial incentives for local residents. Considering the expansion of renewable energies in Germany, where social acceptance is the backbone for a successful energy turnaround, an energy cooperative in Krive Livade can make an important contribution here.

It should be noted that the underlying grid prices for heat and electricity in Serbia are very low by European standards. Competition and thus barriers to market entry are therefore a hurdle for renewable energy systems. This finding leads to another important component that this project takes into consideration: Serbia's striving for inclusion in the European Union. It triggers a change in Serbia's energy system, in which energy producers and grid operators are jointly in public ownership. In addition, meeting the REScoop standards when the energy cooperative is founded, strengthens democratic participation and decision-making processes and sharpens the sense of community among the residents. As a pilot project, it is also an important reference point within the neighbourhood and the entire country, which can be used for training purposes and thus increase awareness of sustainable energy supply throughout Serbia.

NICHES2NIŠ

FINDINGS

INTRO

A common heritage of the socialist era in Central Eastern European countries (CEE) are the large housing estates (LHEs) designed with wide green spaces. These residential areas were further developed and filled in with new constructions and parking areas at the expense of public spaces, after the breakdown of socialism. Nowadays, these areas represent one of the most densely populated districts in CEE cities. However, the adequate transformation of urban forms (public open and green spaces) was mainly neglected by city governments, which created some of the current challenges of these cities. Similar changes define the contemporary urban forms of the Krive Livade Neighbourhood in Niš, Serbia (Figure 43). The district characterised by socialist large housing design facing many challenges in terms of public space transformation.

CONTEXT

The collapse of socialism and the resulting structural transformation defined by democratization, globalization, Europeanization, and market changes significantly influenced the current state of sociopolitical and economic development in these CEE countries (Hamilton et al., 2005; Nedovic-Budic, 2012; Tosics, 2004; Vranic et al., 2014). In the late 2000s, in Serbia, the decentralization

FIGURE 43 - Cover Photo (Bennett, 2019).

processes started with the adoption of the Law on Regional Development and the creation of a Spatial Plan of the Republic of Serbia 2010-2020. The plan foresees the decentralization processes and the formation of the polycentric model of urbanization and regional development, to outbalance the adverse demographics and socioeconomic effects due to the uncontrolled urbanization post break down of the former socialist regime.

“However, since the adoption of the Law, until today, nothing has been done on the implementation of mechanisms that would conduct regionalization of the country and the decentralization of functions from higher to lower (regional) level of governance.” (Ministry of Construction Transport and Infrastructure, 2016).

Another urgent action in the CEE region was privatization, which allowed citizens not just to reclaim their properties, but also enabled municipalities to sell public properties. Kulcunova (2016) points out the impact of privatization processes on the public space;

“Spaces, once designed as public, are handled as private without any collective consensus to ensure shared ownership.”

On the one hand, the newly privatized areas become the stage for new development, parking lots or remain brownfields (Kulcunova et al., 2016), while the remaining public spaces, due to the lack of coherent regulations, institutional capacity, and the missing active community, are slowly degrading and showing a disruption at the sociopolitical level.



FIGURE 44 - Collage Nis (Bennett, 2019).

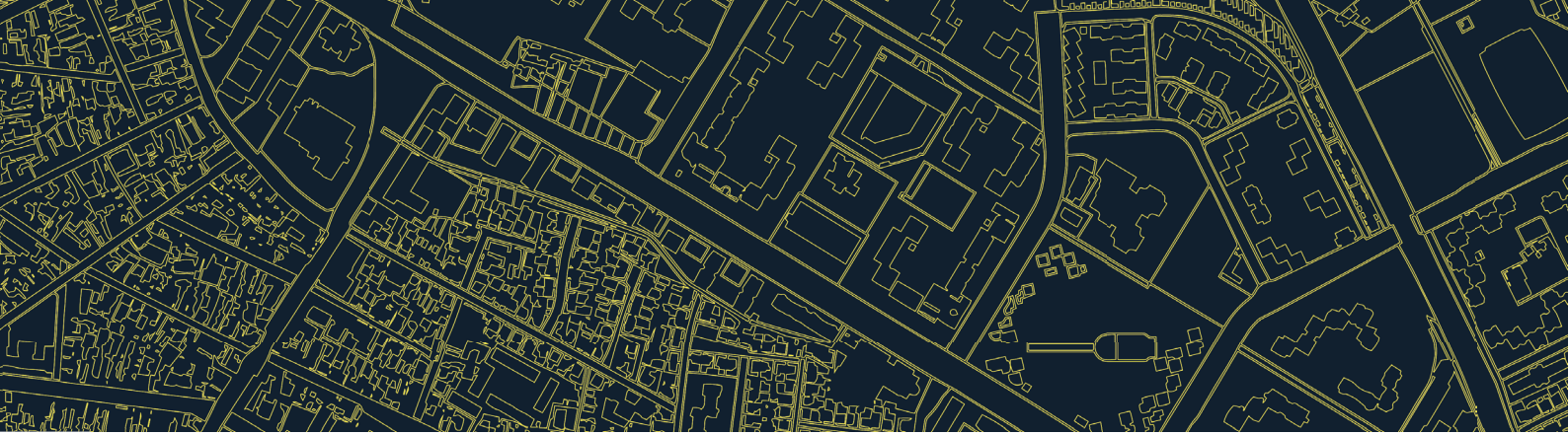


FIGURE 45 - Line map (Bennett, 2019).

CHALLENGES

The main scope of this project is to reflect on socialist and post-socialist transformation actions in order to understand the current challenges towards regeneration processes in the city of Niš, Serbia. One of the identified problems is the **weak local government**: even though by law, cities have autonomy in decision making, the delayed implementation of decentralization processes are weakening and diminishing the power of city governments.

The second identified problem is the **lack of participatory processes**: findings show evidence that efforts were made to create new participatory methods, however, they have not been applied.

The third problem, **public space degradation**: a result of the complex and unfinished transformation processes, result in a passive community, and a gradual loss of ownership sense towards common goods.

Finally, it collectively leads to the degradation of the urban environment and the increase in abandoned spaces in the Krive Livade neighbourhood (Figure 46).

These three problems led to pinpoint a core challenge – **the human – urban environmental gap** (Figure 47). Considering the listed issues, it is crucial to find adequate solutions on how to empower local governments, involve

and engage the community in regeneration processes, and enable them to generate urban projects to revitalize, preserve, and create common goods.

The gradual detachment of humans from their environment has had serious consequences, such as increasing spatial segregation, the formation of abandoned and unsafe places and drop in public security. Therefore, activating the community through bottom-up initiatives and enabling them to take control of their public goods can be crucial for the Krive Livade neighbourhood.

RESEARCH QUESTION

How to connect people and urban environment to enhance regeneration processes by using architectural solutions and participatory methods in Niš?

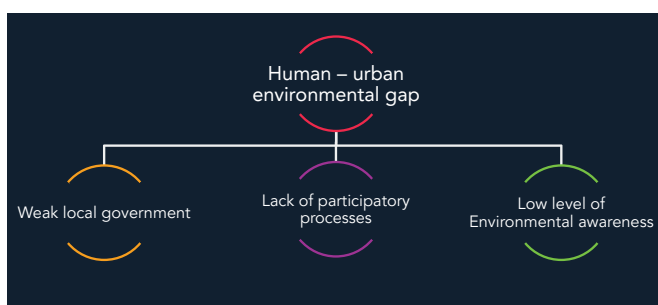


FIGURE 46 - Problem Tree (Barabas, 2019).

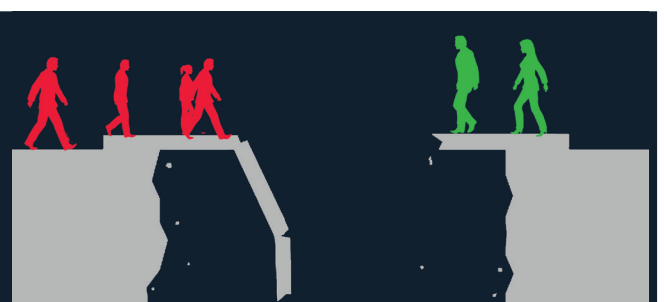


FIGURE 47 - Broken Connection (Barabas, 2019).



FIGURE 48 - Concept scheme (Barabas, 2019).

PROPOSAL

CONCEPT

“The public place emerges as soon as someone else, besides me, appears on a given territory. Thus, I have a chance not only to look around me but to be looked upon at the same time. The enspacement of the action of looking and being looked at is the elementary level of public place. This place will exist only as long as the event that invents its own necessary space lasts. The event “takes place” – it unfolds the space of its occurrence – in a system of dynamic relations where visibility plays an essential part. It is established at a given moment (and for a determined time) between at least two human beings.” (Ioan, 2007)

This philosophical description exposes the essential components of public space creation: at least two human beings, interaction (visibility) and a territory. However, by taking out social elements, the “public spaces” do not arise and remains a space without the public. These abandoned spaces are existant in the Krive Livade Neighbourhood. Since this project has the primary focus of public space and community activation towards neighbourhood regeneration, it is essential to understand how to bring back humans in spaces to “unfold the public space” and diminish the human/urban environmental gap. It is clear that to achieve a neighbourhood and public space regeneration, the community needs to be activated, and it has to take actions, while the local government has to make efforts to be open and receptive towards new initiatives coming from the community, and see the citizens as active partners in the transformation process. Therefore, the project concept relies on three pillars – Community, Governance and Space; the interconnectedness of these elements are undeniable in an urban context (Figure 50). As the relation between the urban components can be poisonous and can slowly

decompose each other resulting in decay, on the reverse cycle, they can empower and feed each other towards prosperity.

‘Niche’ defined

- 1) - “A habitat supplying the factors necessary for the existence of an organism or species or
 - 2) the ecological role of an organism in a community, especially regarding food consumption.”
- (Merriam-Webster Online Dictionary, 2020)

The two definitions of “niche” are a perfect illustration of how components can act as habitat, which supplies vital resources for their organisms. On the other hand, the “niche” can be a unique and essential role of an organism which supports the more extensive system. Therefore, the project’s core concept called “Niches2Niš”; on the one hand, urban components behave as a separate organism and contribute to a “Niš ecosystem”, on the other hand, the elements come together as a “Niš habitat”, to supply the necessary conditions for this system (Figure 48).

SOLUTION

The execution of the concept relies on the “Regeneration cycle” — ten-year action plan — which aims to reverse and improve the current relationship between the three urban components Governance, Community and Space. Through the proposed three objectives and 13 actions, the project aims to give back the public to the space, and space to the public. The project envisions:

Krive Livade is a neighbourhood with an active community, high quality of public spaces and pioneers for bottom-up initiatives.



FIGURE 49 - Community Hub End Result (Bennet, 2020).

The Regeneration Cycle action plan foresees short-mid- and long-term actions with a horizon in 2030. It has the overall goal to foster neighbourhood regeneration and enforce human-urban environment connection through three specific objectives with a total number of 13 general actions with soft and hard measures. These elements ensure a robust framework for the project implementation and provide enough flexibility for the local working group to shape activities and create new methods. On the one hand, the actions with soft measures are aiming to facilitate partnership, open communication and collaboration between the community, public authorities towards inclusive governance, and more active community; while other proposed activities tackle a stakeholder activation and small-scale interventions to increase the quality urban environment, for instance, through the implementation of Niches2Niš neighbourhood toolbox. This small-scale installation has a unique design tailor-made to both the location and to the community needs. It aims to initiate and establish the first reaction-action cycle between the habitats and environment. The box provides tools for citizens for urban gardening, or seating arrangements for events, workshops facilitated by the locals. Overall, the toolbox offers the necessary means and tools for the community to establish a better and involved community, to facilitate discussion among the stakeholders and to regenerate public spaces (Figure 49).

Goal. To foster neighbourhood regeneration and enforce human-urban environment connection.

SO1. Strengthening communication and collaboration among citizens, public authorities, privates, and civic society by establishing a communication platform.

SO2. Creating and strengthening participatory processes by creating new methods, tools.

SO3. Enforced relationship between citizens and urban environment through raising awareness campaigns, workshops and bottom-up initiatives.

CONCLUSION

Space is one of the most crucial elements of cities. Spatial organization of cities and neighbourhoods are directly linked to specific sociopolitical and economic sectors. This project correlates sociopolitical and spatial aspects of a large housing estate - Krive Livade Neighbourhood – in Niš, Serbia. The footprint of the slow, incomplete and weak transformation processes and the defining external influences such as globalization and Europeanization, leave fractures in the socio-spatial and political organization of Niš. In the case of Krive Livade Neighbourhood, these fractures manifest in the gradual loss of ownership towards common goods, the increasing distrust between citizens and local authorities, while the urban public forms are decaying by merely waiting for restructuring and revitalization. Therefore, the project proposes a ten-year implementation framework for community and neighbourhood development based on case studies from other CEE countries. The proposal intends to unfold the possibilities to strengthen the human-urban environment linkage.

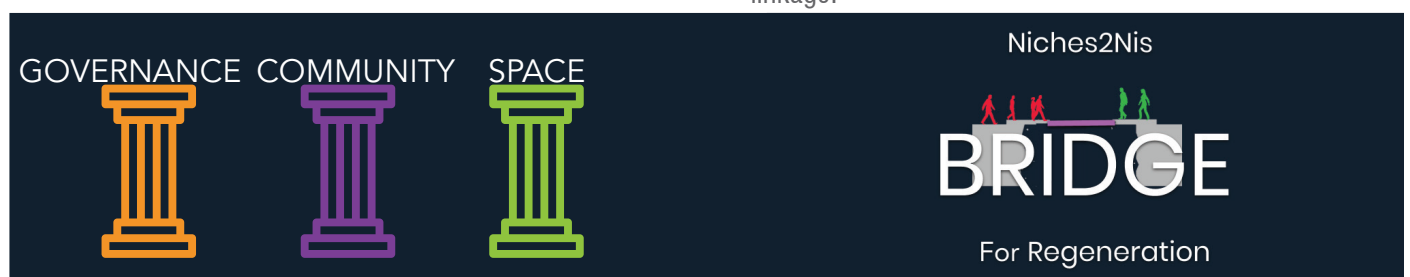


FIGURE 50 - Project pillars (Barabas, 2019).

FIGURE 51 - Solution diagram (Barabas, 2020).

LET'S ZIP THE GAP



FIGURE 52 - The garages, before & after

INTRODUCTION

Large housing estates (LHEs) were built in most European countries after World War Two to provide shelter to the people. Niš is the third largest city of Serbia, one of the Balkan countries. LHEs in the Medijana municipality provide shelter for mixed social classes. The social context, infrastructure and management varies between these housings in different cities, each has their own benefits and some flaws. Waste management and recycling are among the key factors of sustainable urbanism. Serbia has been trying to adopt the standards of the EU since 2012 (Šajin, 2019).

Based on studies and analyses, it was found that waste management in the neighbourhood is poorly managed. Though there are many attempts by Public Utility Company (PUC) Medijana to manage the waste, like the purchase of new trucks for waste transport, GPS systems, new technologies, and underground containers; however the problem of waste management still persists in the city. Through the research it was found that LHEs in Medijana have a high fraction of textile in their waste which is 15%, next to biodegradable waste which is 39% (Anthouli et al., 2013). At the European Union level, the purchasing of clothes has increased by 40% in recent decades, out of which only 1% is recycled (Šajin, 2019). Clothing has a higher footprint on the environment: it requires an enormous amount of resources and energy in

its production cycle. Handling the waste in a proper way could save landfill space, limited natural resources and also the harmful effects on the environment (Anthouli et al., 2013).

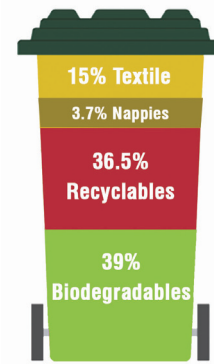


FIGURE 53 - Shares & Types of waste in the residual bin

Though the city had good industrial growth in the past, unemployment is one of the major challenges in Niš. The unemployment rate in Serbia is 13%, whereas it is 30% in Medijana. Of the 30% unemployment rate in Medijana, 55% are women and the rest are men - 3765 women are unemployed in the district (National Employment Service, 2019).

GOAL

The main objective of the project is to avoid textiles ending up in the landfills by involving unemployed women and in the process empowering them. Upcycling of these clothing by women would generate income for them and reduce the environmental impact of textile waste.

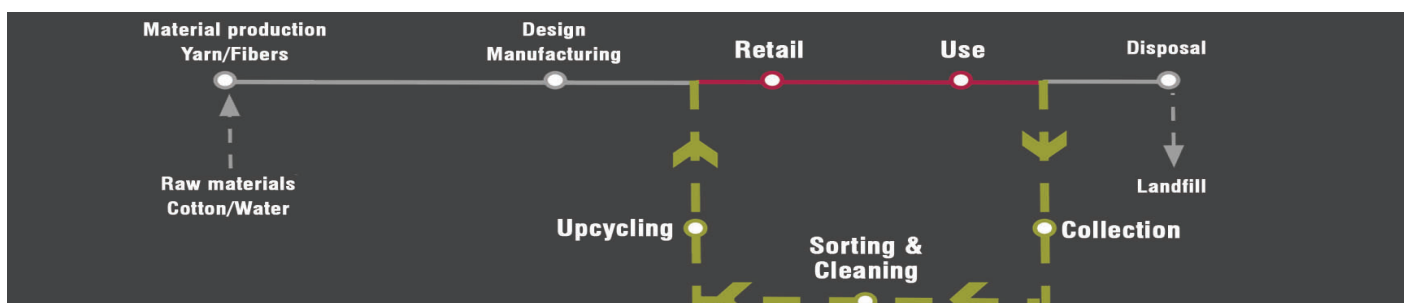


FIGURE 54 - Life cycle of textile



FIGURE 57 - Imaginary section of the exhibition in the local market

and multiplying the result by four residents on average per flat, it makes 320 people living in the block. Knowing that the annual amount of municipal solid waste generated per person in Niš is 286 kg, the assumed amount of textile waste generated in the selected building from 320 people is 1144 kg per month. This amount of generated fabric is more than the basic need for 10 women to work with. Hence, the collection operation stops when the required quantity is reached until the further expansion of the project based on its success.

Collection system: Special bags made of fabric having the logo of the project will be distributed to the flats where every family could gather the textile waste. Two people will collect the necessary amount of textile twice a month and bring it to the storage area next to the workshop. The two people could be unemployed or students looking for a part time job, possibly residents of the buildings. To motivate the residents for the cooperation, two options will be suggested: First, benefiting from reduced price of upcycled products evaluated by the marketing team according to the amount of provided fabric. Second, getting a 500 Serbian Dinar voucher which can be used to buy the upgraded products for every given bag. Finally, people might donate for free, just to help women ameliorate their situation.



FIGURE 58 - Incentives for old textile collection

The Fabric treatment: This will be realized by a special team through four steps: First, taking off the buttons and zippers and all the non-fabric material. Second, the manual sorting which aims to distinguish the valuable textile from the deteriorated one. The clothes that are in good condition need to be sorted according to the color and the type of fabric. Third, washing the different textile separately according to the type and color. Fourth, transforming the ruined textile into fibers through a textile waste recycling machine. The fibres could be utilized for stuffing pillows or soft toys.

Upcycling of clothes: The last Saturday of each month, each trained woman visits the workshop to collect an amount of prepared fabric, take it home and transform it to new designs based on the techniques learned during the training and adding a touch of personal creativity. The last Saturday of the next month, every woman brings back her products to the workshop, thus the marketing team can start working.



FIGURE 59 - Upcycling of old Jeans

The marketing team composed of two people from the faculty of economy and working part-time, will be responsible for designing some attractive posters exhibited in the public space in the neighborhood to encourage the residents to separate textile from the rest of their waste and donate it. The marketing team will also be in charge of organizing a monthly exhibition that will

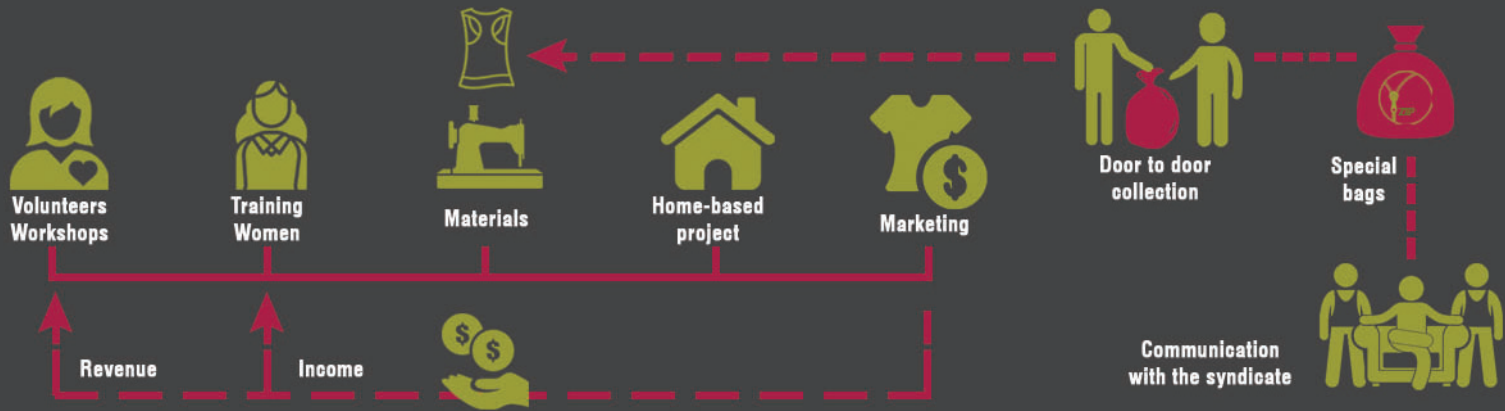


FIGURE 60 - "Let's Zip the Gap" Cycle

occur in the central plaza of the local market (Boško Buha) which is frequently visited by people. The exhibition of upcycled products teaches the shoppers simple techniques to mend and reuse damaged clothes and also creates awareness of textile waste. The marketing team is also responsible for creating, monitoring and maintaining the website of the project: www.letszipthegap.rs that aims to spread the project idea and increase sales at the national and the international level. The users of the website could find job opportunities, a schedule of public events and workshops, a toolkit for clothes mending and handmade products for sale.



FIGURE 61 - Advertising poster

Stakeholders: The project involves the participation of different actors. First, the project team composed of several sub-teams for design, marketing, management, and monitoring. Second, the sponsors for raising funds through the crowdfunding campaign and the Aster Textile company. Third, the city of Niš, approving the project. Next, the trainers: experts from Aster and volunteering instructors from the faculty of Fine Art and the trainees: 10 women chosen from the selected building will assist the workshops and start upcycling the fabric from home. The garage owners who will rent the project location and the residents who will provide the primary material also play a key role.

The Medijana municipality might potentially reduce the taxes on waste collection. Finally, the educational institutions might collaborate with the project team to organize workshops in order to spread the idea of upcycling textile waste and its impact.

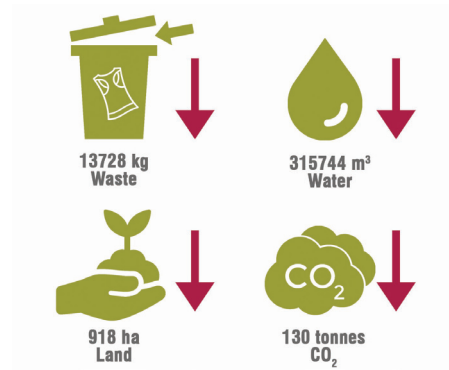


FIGURE 62 - Expected annual environmental savings in the project

Project Monitoring: This involves supervising all phases and activities, right from planning to ensure that the project is running according to the schedule and the budget. It could be ensured through surveys in the neighborhood to check people's acceptance of the project, quantifying and qualifying the attendance in the workshops to evaluate women engagement, monthly reporting of the amount and quality of the collected material and the final products to adjust the collection frequency, evaluate the efficiency of the workshops and estimate the marketing and sales.

CONCLUSION

"Let's Zip the Gap" can lead to progressive changes in the quality of living in multi-story housing areas through improving the financial condition of many families and conciliating the inhabitants with a fragment of their built environment manifested in the garages. Handling the waste in a proper way could save landfill space, limit the exploitation of natural resources and also limit harmful effects on the environment.



BIOWASTE MGT. TECHNOLOGY

FIGURE 63: Food intake site in Southampton University park UK

INTRODUCTION

The large housing estates (LHEs) in Niš are currently experiencing numerous challenges such as garage capitalism, unregulated waste management, poorly managed open spaces and green fields, noise disturbances, lack of public awareness and unorganized parking spaces. Several problems were identified during a field inspection in the study area in the LHEs of Bulevar Nemanjića in Niš. Despite these hurdles, the inhabitants enjoy the gains accrued from this neighbourhood, such as accessible walking distances, several playgrounds for children, safety at night hours and community gathering hubs for pleasant memories. Although the interviewees stated there is no systematic and organized waste separation from the municipality in the entire neighbourhood, simultaneously individual contributions to purchase waste materials may aid in solving the issues.

The LHEs were built in the 1970s, with approximately 40,000 inhabitants occupying these buildings today and a total built area of approximately 94 hectares alongside a population density of approximately 400 to 450 persons per hectare (Dekić, 2019). Niš is the third largest city in Serbia with more than 250,000 inhabitants, and a total area of 596.73 km²; the population has been relatively stable over the past 20 years. The territory of Niš is related to the Nišavski district that represents the centre of this regional area. During the period of the industrial era, the employees usually received flats in high-rise buildings that came to be known as the social housing of today (Dekić, 2019). However, biowaste management technologies is an idea proposed to achieve a sustainable climate-responsive neighbourhood in post-socialist Niš to improve quality of life, and benefit tourism in the local region.

Therefore, the focus of this proposal is to extract organic materials and food waste from the households with the support of the inhabitants and to target the stakeholders through public awareness, education and workshops so as to achieve a waste-free community.

FOOTPRINT

During the site visit to the Bulevar Nemanjića, the foremost impression of the study area was an inefficient waste management disposal unit with different categories of waste littered on the ground as well as the open spaces. Although there is provision for waste disposal containers from the municipality, there is a non-organized waste disposal within the district. Therefore, the primary phase of the project is to organize educational awareness and a workshop programme to sensitize the inhabitants on the possible health risks accrued from unorganised waste disposal if not properly managed.

Currently, the Public Utility Company (PUC) of Niš, a state-owned waste company responsible for the waste collection and disposal in the neighbourhood accounts for 39 waste disposal sites within the study area. The PUC has employed several strategies to control waste management in the city of Niš, yet, the situation remains unstable. However, average annual quantities per capita of municipal waste in Niš amount to 68,000 metric tons (Ćeranić et al., 2012). Therefore, the large quantity of waste produced in the city is the major hurdle to why the PUC is unable to control the increasing amount of discarded materials generated within this district.



FIGURE 64- Flexibuster AD plant on site substituting waste trucks on the streets



FIGURE 65 - Proposal for elimination of waste trucks on the streets

PROPOSAL

it was observed during the field survey in Niš, that food and organic waste posed a tremendous risk to the inhabitants and other stakeholders. Although the LHEs generate an average biodegradable waste of approximately 3600 kg/d, this figure speaks poorly on the image of the city due to unorganized systems in place, therefore, health problems as a result of bacterial infections are currently increasing.

However, waste generation in the LHEs is calculated based on the study of the total number of inhabitants in the buildings, as well as the per capita waste produced in the study area. Therefore, examining the accessible data and other variables, the total waste generation in the study area was evaluated at 0.79 metric tons per day (Ćeranić et al., 2012).

Applying due diligence and careful study on the subject area, the project site location requires an open space within a 100 meter radius of walkable distance, being accessible for the inhabitants to dispose their household garbage. The Boško Buha market and the school site locations were selected as potential sites for the neighbourhood (Figure 70); these locations were selected due to the large quantities of biowaste generated in the study area annually. Thus an open area of 260 m² behind the Boško Buha market was identified as a potential site to install a Flexibuster Anaerobic Digester (AD) Biowaste Plant. The plant was carefully sited to accommodate a 100 meter radius walking distance within the neighbourhood, to reduce food waste transportation cost, reduce volumes of food waste sent to landfills, eliminate the movement of waste collection trucks on the street and combat carbon emissions in transporting biowaste from one point to another (Figure 65). Studying the movement of transporting food waste collection and disposal daily, the

Flexibuster anaerobic digester plant saves an important amount of money for the inhabitants on biowaste transport, as well as a reduction of traffic congestion on the streets and highways.

The quantity of waste collection from several households must be done within an interval of one to four days, to avoid health problems, hygiene issues and undesired odours in the vicinity. Despite this, the size of the disposal site has the potential to accommodate and store the waste generated from the Boško Buha market and the Large Housing Estate environs.

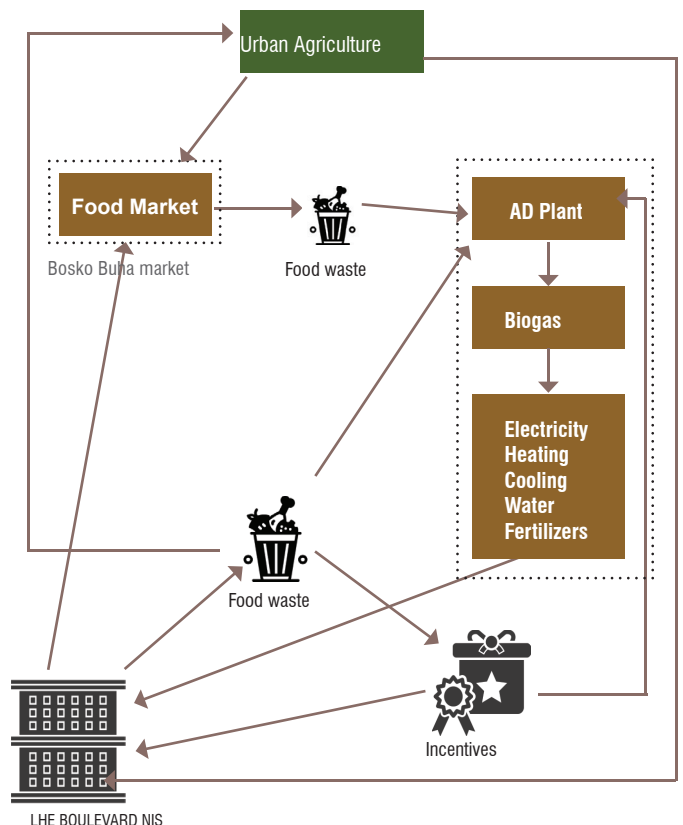


FIGURE 66- Proposed closed-loop food waste recycling model

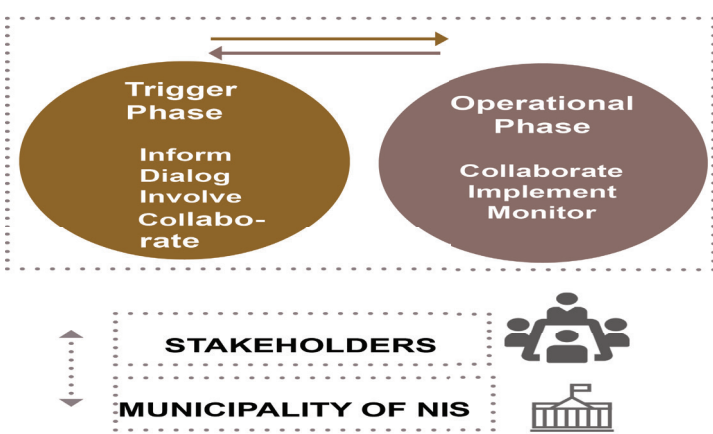


FIGURE 67 -Stakeholders participatory approach



FIGURE 69 - Waste as opportunity

STAKEHOLDERS

For a successful project to be achieved, the involvement of target and relevant stakeholder must be ascertained. Here, the stakeholders are categorized in three sectors of target groups such as the: residential (e.g. LHE residents), commercial (e.g. Boško Buha Market), and institutional (e.g. educational research and schools); other relevant stakeholders are the hotels and bars, restaurants, market stands, supermarkets and private sector. The main purpose is to inform and consult the stakeholders on the various steps and phases of this proposal.

CONCEPT

This concept is based on a public participation system, on which a four-year plan was set up to achieve different phases of the proposed project. The four years interval is between 2021 and 2025. However, during the inception phase starting from 2021 and ending in 2023, information exchange and dialogues with stakeholders will take place, thereby assisting them to understand the problems, alternative opportunities and solutions, as well as to obtain public feedback with a focus of achieving a community engagement concept.

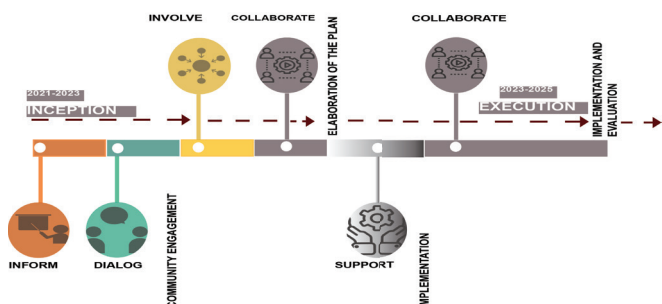


FIGURE 68 - Participatory concept diagram

As good communication sets in within the stipulated years interval, the involvement and collaboration of the stakeholders is essential to ensure that public aspirations are harmoniously understood and considered as well as

to partner with the stakeholders in each aspect of their decisions, with a focus to achieve an elaboration of the plan. The execution phase, between 2023 and 2025 entails the communication between the project managers and the stakeholders due to the support administered, collaboration and trust to achieve implementation and evaluation. However, there are provisions for an incentive for the users that separate their biowaste and convey them to the numerous gathering units, and they will usually receive free compost material to improve open space gardens within the LHEs, free waste trashes and waste bags, and free workshops for students. On the other hand, additional provision for placing waste bags on the doors of each household take place, in order to support the separation systems. The biomass production from the Flexibuster anaerobic digester plant can be sold as fertilizers to the farmers, and the resultant biogas supplied as a source of electricity to schools, for research purposes, and heating for LHE residents.

TECHNOLOGY ADOPTION

Considering the mixed-use type of building arrangement of the LHE, the Flexibuster anaerobic digester biowaste plant was considered as a viable option for the neighbourhood: the system converts food waste into energy from the site of waste production, it is a containerized plant with a modular design system, easy to install, has low maintenance features, is reliable, a rugged design and additionally provides a remote monitoring device with the following dimensions: 12 x 2.44 x 2.8 m (pasteurisation tanks and digester): and 6 x 2.44 x 2.8 m (biogas storage: and a small Combined Heat and Power unit (CHP).

Capacity: 500 to 3500 kg of food waste per day. The

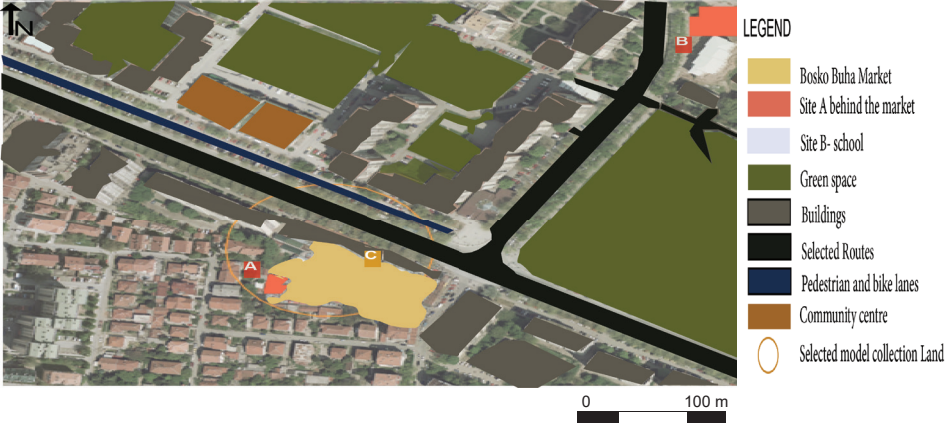


FIGURE 70- Selected site implementation in Nis



FIGURE 71 - Site A: Plant Site, Area- 260m



FIGURE 72 - Site B: Os, Sveti Sava kindergarten School

Energy/Water requirements: 5% to 10% of output electricity needed for parasitic load; output heat: 60% to 70%, Output: fertilizer, biogas generated in 15 days and burned to produce heat and power. Approximately 2.5 to 3.5 metric tons of organic waste will be treated per week.

However, based on the evaluation details that 260 m² open area behind the Boško Buha Market will serve as the storage and collection point for the inhabitants, the other stations will be mainly for the schools and business branches (Figure 72).

FUNCTIONING PROCEDURE

The AD plant takes in food waste, chops it, mixes it, pasteurizes it, and then sends it to a digestion tank, later food waste is consumed by bacteria to produce biogas, which is used to generate electricity and heating. The released biogas is comparable to natural gas, which is used as fuel to generate power to propel vehicles. The plant provides a sustainable solution for several wastes producers opting for a safe method to reduce landfilling, and it provides a closed-loop recycling service by collecting waste from the adjacent Boško Buha food market, LHE residents, businesses branches, schools, hotels and restaurants, in return supplying fuel to generate power for households and fertilizer to improve soil fertility etc.



FIGURE 73 - Decrease in waste and increase in energy model

TECHNOLOGY & SUSTAINABILITY

Flexibuster anaerobic digester plant is delivered to the site ready for plug- and- play installation and ready to use, food waste is tipped into the mouth of the AD plant and enables the plant to operate automatically (SEAB Energy, n.d.). It also extracts the maximum energy from the waste stream in the form of biogas, which is used to fuel a CHP engine to provide electricity and heat, the inbuilt pasteurization process can treat a wide range of feed-stocks in an odour-free environment.

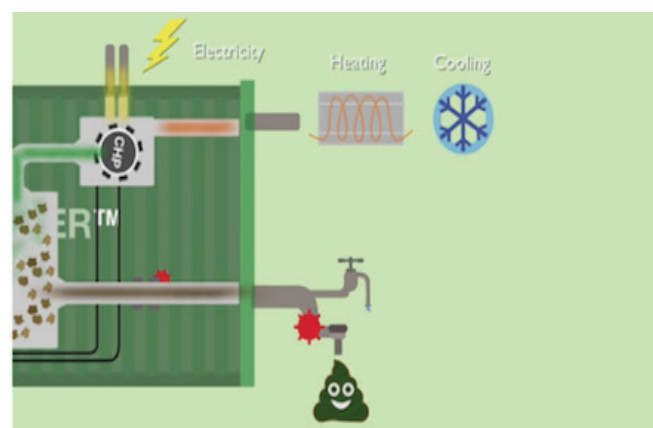


FIGURE 74 - AD biogas conversion unit

Additionally, the plant turns food waste into energy right at the point of waste generation and provides a logical and sustainable way of capturing the remains of energy in food waste. Meanwhile, free energy can be generated on the site which reduces the cost of waste transport, it is also fully automated and remotely monitored. The plant is furnished with sensors that control and automatically prepare the flow of the material through the system for digestion. Technically, the plant reduces energy and waste management costs, the carbon footprint, and it is also an income source, thereby turning waste into an opportunity for sustainable energy production (Figure 69).



CONCLUSION

Photo taken by Jonathan Young (2019)

by Diego Robles & Madhulika Velankar

The starting point of this research relating to the wider conjuncture and status quo of Niš was the site visit, where physical observations evidenced the existent situation in the city, which was the cornerstone for further analyses and results. The proposals presented in this document convey different methodologies and approaches to address the post-socialist transformation of Serbia: supporting local economy, revitalizing neglected open spaces, improving energy efficiency, reducing waste, encouraging public participation and boosting the local economy of the city. In all cases, the expected outcome, as a result of successfully delivered proposals, is an enhanced participation of the inhabitants of Bulevar Nemanjića, which has the potential to be extrapolated and replicated in different parts of the city. Final recommendations given, in some cases, provided unconventional methodologies that target challenges from bridging a communication gap between the residents and authorities; to empowering the women in the neighbourhood through local businesses.

Although the benefits of these projects are palpable, their feasibility largely depends on the positive response of strategic stakeholders accounting for high power and high interest: as of today, Serbian society, influenced by the democratic deficit phenomenon, has a low capacity of response towards matters of public interest. Therefore, the realization and correct delivery of the described proposals is jeopardized by the financial capacity of the local institutions. Failing this, the dispensation of funds from international cooperation or private investments, which, in every case, would be subjected to a sluggish Serbian bureaucracy. In addition to this, technological

availability, social acceptance and sustainability of the operation over time, are among other factors of risk for the projects. Creating a significant closer relationship between inhabitants and the local government is set to be one of the major challenges: the implementation of economic instruments and an enhancement of the local culture would potentially improve these interactions.

Prior to the site visit, the recommendation for further projects taking place in Niš is to induce the participants towards a basic and preliminary understanding of the structure of the governance in Serbia, its culture, the existing socio-political context, and projections in relevant topics such as: politics, economy, trends in renewable energy and emerging policies. This familiarization with the country and its conjunction is set to enhance the experience of the site visit, comprehend the occurrence of the phenomena taking place in the city, and develop improved ideas of innovations for Niš.

The proposals described and illustrated in this document aim to enhance the sustainable urbanism of a city impacted by socio-political, economic, cultural, and infrastructural transformations through the last decades. Nevertheless, for the success of these projects, it is imperative that the involved major stakeholders are in agreement to overcome the current obstacles present in the society of Niš, and Serbia in general. The results of an efficient utilization, renovation and development of the existing resources in the city, are set to potentially derive in the strengthening of Niš as a whole.

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