

**FUTURE OF URBAN CENTERS: RE-IMAGINING METROPOLISES AS  
ECOLOGICALLY BALANCED CITY CENTERS IN THE CONTEXT OF BELGRADE,  
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**ABSTRACT**

If the city's center does not have a historical background, it is often overlooked in modern-day urban development, leading to deterioration over time. If urban centers are seen as the city's everlasting hubs, they will regenerate life and atmosphere, benefiting residents and tourists. The detrimental effects of metropolitan development on the environment remind us of the dying planet. Architects influence how cities build environments for everyday users. Many cities, such as Berlin, Hamburg, and New York, were created near road or waterway junctions, where urban centers developed with functions like seaports, markets, and town halls. Fortifications separated the city from the countryside, and crafts and population grew with trade. The urban area soon spread around the city's main roads as fortifications shifted. Climate change and landscape changes have led to the spread of peri-urban areas worldwide, serving as "laboratories" for studying human-nature relationships to prevent land degradation. This research aims to create harmonious spaces that offer a unique experience without harming the environment. This thesis addresses the need for a redesign of Belgrade's city center, integrating its historical and modern areas while tackling environmental and socio-economic challenges. Belgrade's rapid urbanization, especially since its post-socialist transition, has resulted in a fragmented urban fabric. Urban sprawl, pollution, and insufficient historical preservation have reduced the quality of life and the connection between the old and new parts of the city. While global urban planning emphasizes sustainability and green architecture, there is a gap in research on bridging the divide between Belgrade's historical and modern environments. This study shows that integrating green spaces and sustainable building practices will solve environmental problems like pollution and resource depletion. By comparing global case studies, the research reveals successful urban design strategies focused on sustainability, walkability, and inclusive public spaces. These design ideas offer strategies to enhance Belgrade's public areas, promote social contact, preserve the city's natural balance, and improve quality of life. The thesis presents a vision for a more resilient, ecological, and socially inclusive urban core balancing modern urban living with the city's historical identity. The result is a plan to revitalize Belgrade's central districts using green infrastructure, mixed-use zones, and improved connectivity. This design addresses pollution and climate change through sustainable urban concepts, aiming to preserve historic heritage while meeting present and future needs.

**Keywords:**

Green planning, Metropolises, redevelopment &amp; regeneration, green spaces and urban development.

## INTRODUCTION

The influence of development and industry in extending the city outwards has been given a high priority, while the city center has been neglected. Recent arguments about the substance and theoretical orientation of urban studies serve as a cautionary tale that the city as a mode of spatial urban cluster is evolving. They have served as an excellent metaphor for critical analysis of urbanization, revealing great scientific variation in urban aggregation forms across time and region. However, by concentrating on the worldwide impact of urbanization, such arguments risk detracting attention from the city center, which is undergoing its transformation.

The sharp rise in public and policy interest in the city center's survival as the paradigmatic embodiment of urban clustering has not been matched by a significant increase in scholarly and theoretical interpretations of its evolution. It pushes for a better analytic knowledge of how the city center has remained so durable as a physical and emotional entity, as well as a stronger participation in programs aimed at re-establishing the city center as a fundamental epicenter of urban sprawl.

The physical form and land use patterns of a city can be locked in for generations, leading to unsustainable sprawl. Urban land consumption is predicted to outstrip population increase by up to 50% over the next three decades, adding 1.2 million km<sup>2</sup><sup>1</sup> of new urban built-up area to the planet. As cities worldwide face rising problems from environmental deterioration, climate change, and unsustainable sprawl, Belgrade finds itself at a crossroads. The lack of historical context in the city center has resulted in neglect and decay, diminishing its potential as a thriving hub for residents and tourists. Rapid urbanization, particularly in peri-urban areas, exacerbates problems like pollution and resource depletion, with cities responsible for more than 70% of greenhouse gas emissions as calculated by the UN yearly report<sup>2</sup>. This thesis talks about the critical need for a paradigm shift in urban development, focusing on integrating green design and sustainable practices to revitalize Belgrade's city center.

The relationship between architectural design and urban vitality is critical; however, present urban planning practices frequently disregard the intrinsic significance of public spaces, interconnections, and ecological balance. With a large proportion of the world's population living in cities, there is an urgent need for cities to adapt to new realities, with a focus on quality of life and sustainability. This research seeks to address these issues by opening the discussion about some sort of redesign or re-planning of Belgrade's city center across both sides (New Belgrade and Old Belgrade) that integrates constructed forms with nature, encourages community interaction, and promotes resistance to climate change. This will result in the people having a better quality of life outside their houses in a new urban core that reflects a commitment to environmental stewardship while celebrating the historical and cultural layers of Belgrade city.

## OBJECTIVES

This thesis concludes with a vision to build a new green core, reshape the previous city center, and emphasize the area's potential. It proposes new social spaces, commercial, mixed-use, and residential structures, while constructing street linkages around the city center, all centered around a large new green area that allows inhabitants to connect with nature. The plan reflects a broad vision for reimagining the city center in light of climate change and the pandemic's impact.

Humans make architecture, a phenomenon that shapes our lives and intersects with layers of human existence and the natural world. Architecture must link the tangible and intangible, preserving time and space in human memories. This effort seeks to revive the site's forgotten essence, transforming the center into a sustainable, carbon-neutral space. The following are some of the main objectives:

- i. To bring the lacking eco-architecture components to life.
- ii. Explore the layers of urban development.
- iii. Suggest the use of design to add liveliness and create an aura.

The project aims to construct a built form resulting from an extensive design process that considers the energy and language of the site. The goal is to restore the site's identity while implanting a new ideology centered

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<sup>1</sup>"Overview." World Bank. Accessed December 28, 2024. <https://www.worldbank.org/en/topic/urbandevelopment/overview>.

<sup>2</sup>Environment, UN. "Cities and Climate Change." UNEP. Accessed December 28, 2024. <https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities-and-climate-change#:~:text=Estimates%20suggest%20that%20urban%20areas,levels%2C%20can%20success%20be%20achieved.>

around the past, present, and future. The main focus is on creating sustainable, open-planned, minimalistic, green, and approachable spaces, with various functions and scales to cater to different users.

### METHODOLOGY

The research begins by studying the problem and its connection to nature and human daily lifestyle. A solid understanding of Green Architecture, Sustainability, Redevelopment, Urban Design, and Infrastructure is crucial to conclude the research. The project starts by selecting a site—in this case, Belgrade—and examining its internal and external variables. The first phase involves collecting both quantitative and qualitative data to understand the site's functionality, present condition, and features. This data will include resources such as documented studies from students, researchers, and environmentalists.

Data collection will involve historical, archival, ethnographic, experimental, simulation, survey, mapping, statistical, and qualitative methods. After selecting a concept, case studies will help translate it into architectural language using research from books and online sources. The research follows Evidence-Based Design (EBD), using logic and reasoning based on context and history. It aims to provide data and case studies that will help build the design foundation and offer positive conclusions to assist others with similar issues.

Some aims and objectives of this research include:

- i. Identifying the roles of architects, users, local authorities, and community members in a city center.
- ii. Contributing to the understanding of how architecture projects are initiated as a collective, relational endeavor within wider social, political, and economic contexts.
- iii. Explicating the knowledge used by architects in early stages of architectural projects.
- iv. Understanding the relationship between man and nature in urban settings.
- v. Identifying the causes of architecture's impact on climate change.
- vi. Understanding the knowledge architects use for green and sustainable urban projects.
- vii. Examining the uses of an urban square, its relation to users and surrounding development, and how architecture can connect them sustainably.

The research starts by reviewing literature on the problem and design proposals, with a focus on global urban development, Green Design, and architectural pollution. This helps evaluate the site and its issues, drawing from studies on city re-imagining and redesign. Published work on Green Design and architectural pollution will shed light on urbanization challenges. The study will analyze Belgrade's site plan using diagrams to understand urban flow and user guides to gain insights from locals. The masterplan will highlight space usage and architectural voids, with comparisons across city zones to identify key issues. Data will reveal areas needing further study for future planning and redevelopment.

Interviews with residents and visitors who have witnessed Belgrade's transformation will offer perspectives on the problem and ensure the research remains focused on the site's various aspects. Precedent studies of projects addressing urban pollution will inform the approach, helping to compare Belgrade's city center with other global examples. The research will propose design solutions from existing cities, showing how Belgrade's design can incorporate these concepts. This will be used to develop design guidelines addressing site issues and demonstrating how architecture has successfully impacted similar spaces.

Key research questions will include:

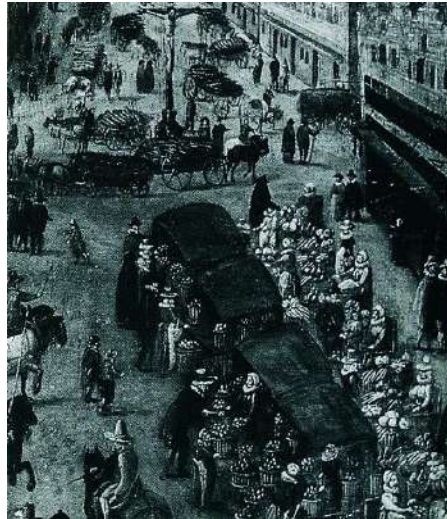
- How does architecture affect the atmosphere of a city center?
- How can design change user experiences in urban spaces?
- Can metropolitan centers be redesigned without destruction?
- How can city centers attract people while being carbon-neutral?
- Can design revive the environment of these spaces?

The scope of research will go beyond online data, focusing on real-time site analysis and interviews with users. The goal is to make an impact on architecture using evidence and design tools specific to the project, while also drawing on comparisons with renowned global city centers and consulting relevant archives and media.

### History and Future of City Centers

The city center, often known as the downtown or central business area (CBD), is the hub of a city where diverse activities intersect away from dense residential streets. This district is mostly made up of commercial

establishments, including markets, stores, restaurants, cafes, and offices, as well as cultural organizations like museums and theatres. It is meant to be easily accessible and often served by public transport, creating a thriving area. The architecture of city centers varies from old buildings to modern skyscrapers, reflecting the city's history. The city center is often used for events, festivals, and public celebrations, capturing the city's identity and liveliness.



**Figure 1 City Market, Antwerp Belgium (1600)**

Figure 1 "History of the City, Street and Plinth." The City at Eye Level, August 3, 2021.

<https://thecityateyelevel.com/stories/history-of-the-city-street-and-plinth/>.

A common example of a city center is Rome, Italy, where the combination of ancient and modern life creates a unique feel. The city, now a UNESCO World Heritage Site, includes iconic landmarks like the Colosseum, Roman Forum, and Pantheon, alongside piazzas filled with cafes and stores. This blend of history and culture makes Rome's city center an intriguing destination for both locals and visitors.

Today, many people live in cities, despite their challenges such as noise, pollution, and crime. Living outside cities poses challenges as rural areas lack the services cities provide. Cities are convenient for people to live, work, and play, and their economies benefit from reduced transit costs and shared infrastructure expenses. The city center is often the focus of movement, linking various city activities and fostering high levels of social interaction.

Urban spaces are crucial to a city's unique structure, providing utilitarian, visual, social, and symbolic services. Historic city centers, like the Greek Agora, Roman Forum, and Rabbah in Islamic cities, have cultural significance and continue to influence modern urban design. However, urban development pressures have harmed these historic spaces, affecting their physical, social, and economic structures.

Cities have grown into the primary agents of the global economy, driven by technological advancements and increased urbanization. In Europe, between 1970 and 2020, metropolitan areas expanded by over 15,000 km<sup>23</sup>, with more than 72% of the population moving to urban areas. Cities are competing to enhance their distinctiveness, with many adopting green city initiatives, though these often overlook the people who live in them.

Urban areas consume natural resources and contribute significantly to environmental degradation. As cities house 55% of the global population<sup>4</sup>, their impact on health and quality of life is substantial. Sustainable urban development is crucial to mitigate these effects, including monitoring air quality and incorporating both objective and subjective measures of environmental quality.

<sup>3</sup> The story of Your City (City, transformed) - European ... (n.d.). [https://www.eib.org/attachments/general/city\\_transformed\\_the\\_story\\_of\\_your\\_city\\_en.pdf](https://www.eib.org/attachments/general/city_transformed_the_story_of_your_city_en.pdf)

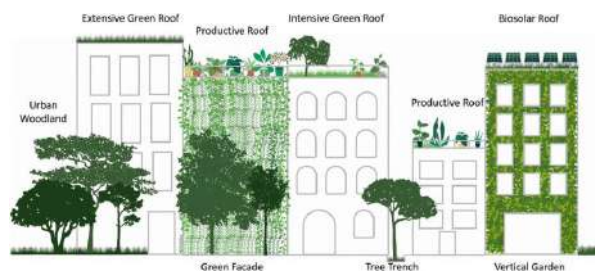
<sup>4</sup> "Generating Power." United Nations. Accessed December 28, 2024. <https://www.un.org/en/climatechange/climate-solutions/cities-pollution>.

By 2100, the urban population is predicted to increase by 60-80%<sup>5</sup>, requiring cities to adapt holistically and sustainably. Smart cities, which combine infrastructure with technology, are emerging to improve residents' quality of life. Barcelona, for example, has implemented smart technology like a fiber optic network and smart management of water, lighting, and parking, creating a more efficient urban environment.

The future of cities will focus on decoupling urban growth from environmental degradation. Cities will be designed to work harmoniously with nature, integrating sustainable practices to accommodate growing populations. This will likely involve reversing urban sprawl and creating smaller, self-sustaining urban centers. Urban infrastructure will rely on real-time data to ensure greater sustainability, with interconnected communities that are environmentally and socially balanced.

### ARCHITECTURE AND ITS IMPACT

Sustainability in architecture focuses on using design processes, materials, and energy systems that do not harm the ecosystem or communities. The goal is to avoid negative impacts on future generations while adhering to social, economic, and environmental principles. Sustainable architecture involves reducing humanity's environmental footprint, from material selection to the integration of heating, cooling, and waste systems, as well as blending the built environment with the natural landscape. It draws inspiration from ancient building practices, now adapted with modern materials and techniques. The natural resources of the site must be considered and incorporated into the design. Architects should use materials with low environmental impact and incorporate systems that repurpose waste efficiently.



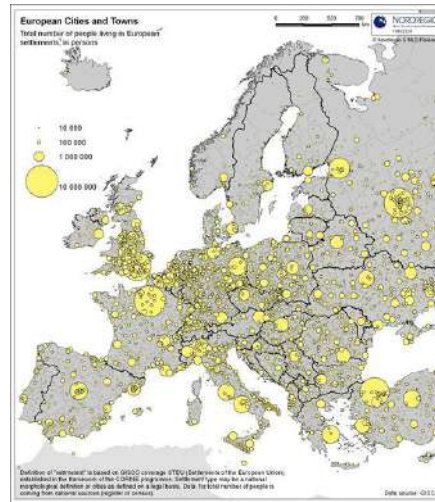
**Figure 2 Green city Elements**

Mehanna, Walaa Abou, and Wesam Abou Mehanna. "Urban Renewal for Traditional Commercial Streets at the Historical Centers of Cities." *Alexandria Engineering Journal* 58, no. 4 (December 2019): 1127-43. <https://doi.org/10.1016/j.aej.2019.09.015>.

Cities are both the cause and solution to many economic, environmental, and social issues. European urban areas house a significant portion of the population and generate the majority of energy demand and GDP<sup>6</sup>. These cities, while driving innovation and economic growth, also face long-standing issues like unemployment and poverty. Urban policies in Europe aim to tackle these issues and improve quality of life by focusing on sustainable urban development. However, rapid urbanization continues, with more people moving to cities, leading to increased land use and urban sprawl. This trend of expanding cities at a faster rate than population growth has led to larger areas being occupied per person.

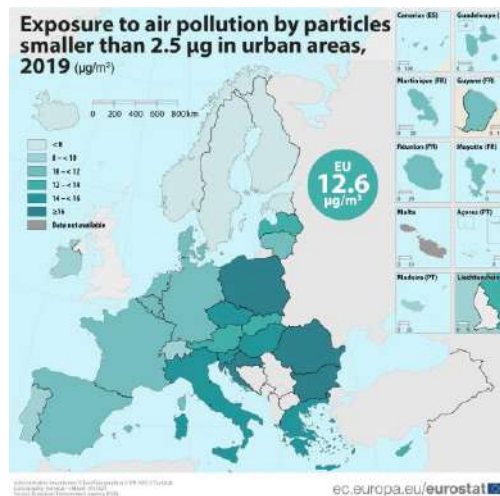
<sup>5</sup> United Nations. (n.d.). World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100. United Nations. <https://www.un.org/en/desa/world-population-projected-reach-98-billion-2050-and-112-billion-2100>

<sup>6</sup> EU annual report 2024. The State of Regions and cities. Accessed December 28, 2024. <https://cor.europa.eu/sites/default/files/2024-09/Report-state-regions-and-cities-EN.pdf>.



**Figure 3 Increasing population in European cities in the last 5 years**

Europe and its Urban Development, 1970 to 2020. European Investment Bank. Retrieved from <https://www.eib.org/en/essays/the-story-of-your-city>.



**Figure 4 Urban pollution based on urbanization toxins through Europe, Eurostat (2019)**

“Statistics Explained.” Degree of urbanisation classification - 2011 revision - Statistics Explained. Accessed December 28, 2024. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Degree\\_of\\_urbanisation\\_classification\\_-\\_2011\\_revision](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Degree_of_urbanisation_classification_-_2011_revision)

Recent research shows a harmful relationship between the built environment and nature. Advances in science and technology have contributed to environmentally unfriendly architecture, making it crucial to reconsider how urban spaces are planned. The focus is now on creating energy-efficient buildings that use resources wisely, including renewable energy sources and materials that minimize damage to nature. Ecological architecture integrates these principles, aiming for high efficiency, balance, and comfort, with a focus on sustainability throughout the building's lifecycle.

Green cities represent a model of long-term sustainability, where the urban environment is in harmony with nature. Green architecture plays a crucial role in enhancing the quality of life in urban spaces by integrating green spaces such as parks and trees, allowing biodiversity to thrive. In these cities, nature is incorporated into the urban form, providing essential services and improving the environment. Urban green infrastructure refers to the interconnected network of natural features within the city, such as parks, gardens, and forests, and is crucial for creating sustainable urban spaces.

**GLOBAL CASE STUDIES**

Several cities globally are recognized as green and sustainable due to their initiatives aimed at environmental and social betterment. These cities, with different climates and contexts, have developed unique strategies for sustainability.

1. **Singapore** leads in eco-friendly design with its "Garden City" concept, featuring green roofs, parks, and vertical gardens. It promotes recycling, clean energy, and water conservation while aiming for "zero waste." Public transport and smart technologies also play key roles in its sustainability.



**Figure 4 A smart and sustainable forest town in Singapore**

"A Smart and Sustainable Forest Town in Singapore." Springwise, April 27, 2021

<https://springwise.com/innovation/architecture-design/singapore-forest-town-green-spaces/>

2. **Warsaw** has advanced in green initiatives, including carbon reduction, renewable energy, and green spaces. Notable projects like the Vistula Boulevards transformation highlight its commitment to sustainability. The city plans to achieve carbon neutrality by 2050.



**Figure 5 Green District of the future Warsaw city**

Durmaz, Özge. "New 'Green District of the Future' to Emerge on Former Factory Site: FSO Park." Arkitera, March 4, 2024. <https://www.arkitera.com/en/project/new-green-district-of-the-future-to-emerge-on-former-factory-site-fso-park/>.

3. **Amsterdam** is known for its cycling infrastructure, green spaces, and renewable energy use. Urban farming and smart city technologies enhance sustainability, aiming for resource efficiency and lower carbon emissions.



**Figure 6 Amsterdam's green city Design**

Picchi, Paolo, Dirk Oudes, and Sven Stremke. "Regional Strategy, Municipality Plans and Site Designs for Energy Transition in Amsterdam, the Netherlands: How Sustainable Are Implementation Processes on Different Spatial Levels?" Sustainability 15, no. 7 (March 28, 2023): 5876. <https://doi.org/10.3390/su15075876>.

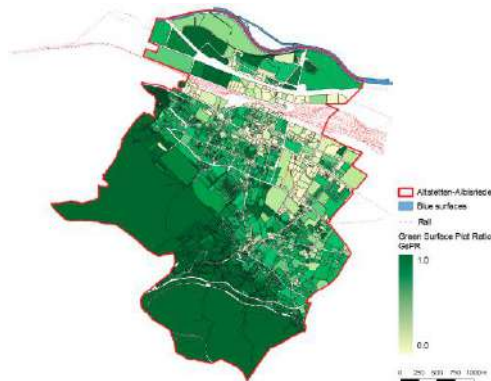
4. **Copenhagen** is striving for zero carbon emissions by 2025, with green spaces, bike paths, and public transport. It uses wind power, energy-efficient buildings, and sustainable urban planning, including green roofs and rainwater systems.



**Figure 7 Copenhagen's Green Corridor**

Hansen, Karoline. "ABGSC Acted as Sole Arranger to Bach Gruppen in Connection with the Raising of DKK 520M in a Loan from AP Pension a Blue Chip Danish Pension Fund." ABG SC, October 28, 2019. <https://www.abgsc.com/company-news/abg-sundal-collier-acted-as-sole-arranger-to-bach-gruppen-in-connection-with-the-raising-of-dkk-520m-in-a-loan-from-ap-pension-a-blue-chip-danish-pension-fund/>.

5. **Zurich** is committed to sustainability with green spaces, efficient public transport, and energy-saving buildings. It focuses on hydroelectric power, solar energy, and waste recycling, aiming for carbon neutrality by 2050.



**Figure 8 Green area map of Zurich**

Perić, Ana, Yingying Jiang, Sacha Menz, and Liana Ricci. *Green cities: Utopia or reality? evidence from Zurich, Switzerland*, June 6, 2023. <https://doi.org/10.20944/preprints202306.0455.v1>.

### DISCUSSION ON URBANISM

New Urbanism, an urban planning movement from the early 1980s, emphasizes walkable, mixed-use neighborhoods and transit-oriented development to counter suburban sprawl and foster community. It promotes human-scale urban architecture with narrow streets, wide sidewalks, and higher density, in contrast to low-density, single-use developments. Its principles offer alternatives to the negative impacts of suburbanization, encouraging urban designs that prioritize public spaces and reduce reliance on private transportation.



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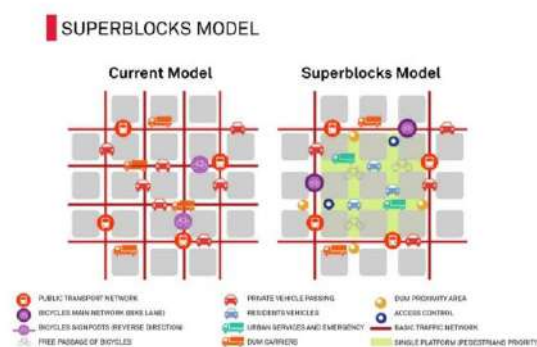
**Figure 9 New urbanism Concept illustration for public spaces, Amsterdam (2021)**

*Vision Inner City groningen, NL: Urban Design Concept, urban landscape design, Landscape Architecture diagram.*

Green Urbanism emerged in the 1990s, promoting zero-emission and zero-waste cities<sup>7</sup>. It emphasizes socially and environmentally sustainable urban areas, drawing inspiration from urbanists like Olmsted, Ian McHarg, and Jane Jacobs. This approach questions how to integrate ecosystems into cities and create sustainable environments where people are reconnected to nature.

The concept of eco-cities has evolved over the past 35 years, with key contributions from figures like Ebenezer Howard, Reyner Banham, Jane Jacobs, and others. Notable works on green urbanism and climate-responsive design, such as the Brundtland Report (1987) and books by Robert and Brenda Vale, have further shaped sustainable city theories.

Superblocks are urban planning units that combine multiple city blocks, reducing traffic and promoting pedestrian-friendly environments. They focus on creating self-contained, sustainable neighborhoods with green spaces, public amenities, and alternative transportation options. These superblocks reduce vehicular traffic, improve air quality, and foster community interaction. However, challenges include concerns about limited vehicular access and potential impacts on local businesses.



**Figure 10 Superblock model general design diagram for Barcelona**

Architecture walks and tours in Barcelona. Architecture Walks and Tours in Barcelona.

<https://barcelonarchitecturewalks.com/superblocks/>

In Barcelona, the Superblock 'Poblenou'<sup>8</sup> project redefined urban space by creating pedestrian-focused streets with green areas. While it has improved air quality and social interaction, there are concerns about its impact on commercial activity.

<sup>7</sup> Lehmann, S. (2011). Transforming the city for sustainability: The principles of green urbanism. *Journal of Green Building*, 6(1), 104–113.  
<https://doi.org/10.3992/jgb.6.1.104>

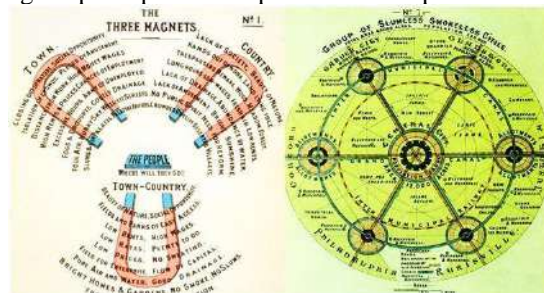
<sup>8</sup> Superblock (superilla) Barcelona-a city redefined. public realm. citiesforum.org. (2021, May 31). <https://www.citiesforum.org/news/superblock-superilla-barcelona-a-city-redefined/>

**Figure 11 Aerial view of Barcelona**

Superblock (superilla) Barcelona-a city redefined. public realm. citiesforum.org. (2021, May 31).

<https://www.citiesforum.org/news/superblock-superilla-barcelona-a-city-redefined/>

The Garden City movement, initiated by Ebenezer Howard, aimed to combine the best of city and country living. It proposed self-contained communities surrounded by green belts, offering high quality of life with access to nature. Howard's vision inspired modern urban planning, and Letchworth, established in 1903, became the first Garden City, embodying his principles of cooperative development and sustainable urban living.

**Figure 12 Garden cities; Ebenezer Howard (1880)**

Gardenvisit.com. 2022. Howard's Garden City Landscape Urbanism. [online] Available at: [https://www.gardenvisit.com/landscape\\_architecture/urban\\_design/garden\\_city\\_landscape\\_urbanism\\_howard/](https://www.gardenvisit.com/landscape_architecture/urban_design/garden_city_landscape_urbanism_howard/)

### UNDERSTANDING BELGRADE

Cities like Babylon, Athens, Rome, London, Madrid, and Paris have shaped world culture at different times. New York, Los Angeles, Paris, Tokyo, and London were key cultural transmitters during the Fordist and Post-Fordist periods. As the world becomes more connected, new cultural centers will emerge to challenge or complement existing ones. Factors such as a vibrant cultural economy, global connectivity, and capital accumulation contribute to their prominence.

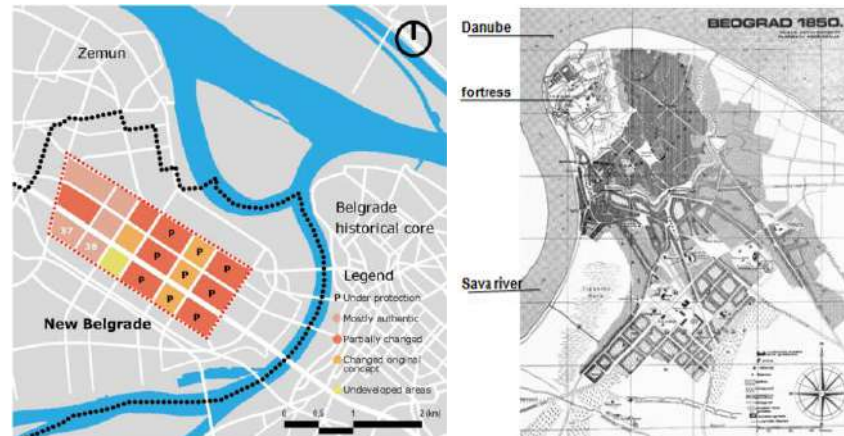
Europe faces significant urban pollution due to architectural and urban development. This research identifies the city with the worst conditions and explores potential redesigns. By analyzing Europe, the research aims to propose solutions based on global case studies for creating greener, sustainable cities.

Urban parks play a key role in promoting sustainability and healthy lifestyles. They offer community spaces, reduce pollution, and cool cities by counteracting the urban heat island effect.

The vision for future cities prioritizes walkability, mixed-use spaces, nature, and modern technologies, all grounded in local culture. Sustainable practices must focus on energy efficiency, material use, and reducing emissions. This urban design proposal seeks to redesign an overused city area, improving sustainability, green spaces, and meeting modern needs. By evaluating European urban air quality, it aims to provide a holistic picture of urban environments' effects on life quality.

Historically, cities were developed around buildings, but today, integrating natural surroundings into urban spaces is crucial. Green spaces are vital for cities with high population density. A community center with green areas could help improve both the environment and quality of life. Serbia, a landlocked country in Southeast Europe, faces rapid urbanization, especially in Belgrade. While modernist architecture shaped urban

development, poor architectural practices and pollution issues have hindered sustainability. Serbia's cities, including Belgrade, struggle with air quality and water pollution, necessitating more comprehensive policies for a healthier future.



*Figure 13 Plans of Old & New Belgrade City*

Belgrade, located at the confluence of the River Sava and the Danube, is one of Europe's most polluted cities, with high mortality rates from air pollution. The city's urban landscape, split between Old and New Belgrade, shows the evolution of its architecture—from historical roots in Stari Grad to modernist developments in Novi Beograd.<sup>9</sup>

Belgrade is missing a central community hub. The selected site for redesign lies between Old and New Belgrade, an unused area with potential for a community center. This space could foster cultural exchange, community engagement, and offer sustainable solutions for a greener, more livable city.



*Figure 14 Site location*

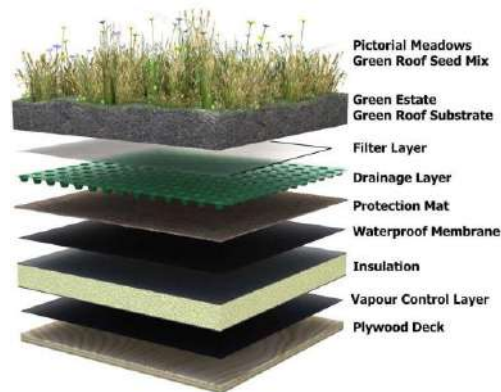
The lack of sustainable architecture in Belgrade raises concerns for the city's long-term resilience. A modern, eco-friendly community center would positively impact both the environment and the community, bridging gaps and promoting social cohesion. In conclusion, Belgrade's future lies in investing in modern, sustainable infrastructure and a central community hub to foster growth, sustainability, and unity.

## REIMAGINATION OF BELGRADE

<sup>9</sup> Sustainable Cities Serbia. Accessed December 28, 2024.

<https://documents1.worldbank.org/curated/en/099102023122572634/pdf/P1761920f790520f10995a0f70d5263bdfd.pdf>.

The ideal city center blends sustainability, functionality, and inclusivity, drawing inspiration from cities like Melbourne, New York, and Barcelona. The proposed community center in Belgrade will incorporate these principles, focusing on green design, smart architecture, and public space integration. It aims to foster a vibrant, sustainable urban environment by prioritizing accessibility, social interaction, and environmental responsibility. Key elements of the center's design include **green roofs (Fig 15)**, which will reduce heating and cooling needs, enhance biodiversity, and manage stormwater. **Mini forests (Fig 16)**, such as Miyawaki forests, will improve air quality and provide green spaces, while **vertical farming (Fig 17)** will maximize space for food production. The **green façade (Fig 18)** will improve energy efficiency, reduce noise, and support biodiversity, while **solar panels (Fig 19)** will generate renewable energy.



**Figure 15 Green Roof section showing layers**

Burca, Jackie De. "The Role of Green Roofs in Promoting Urban Biodiversity." *Constructive Voices*, May 28, 2024.

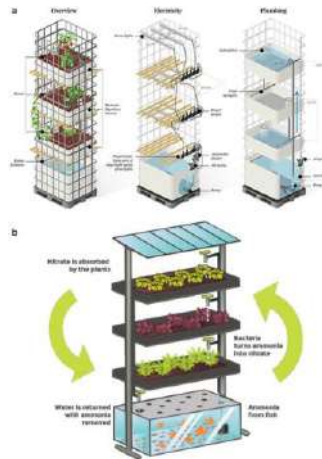
<https://constructive-voices.com/green-roofs-in-promoting-urban-biodiversity/>.



**Figure 16 Miyawaki Forest**

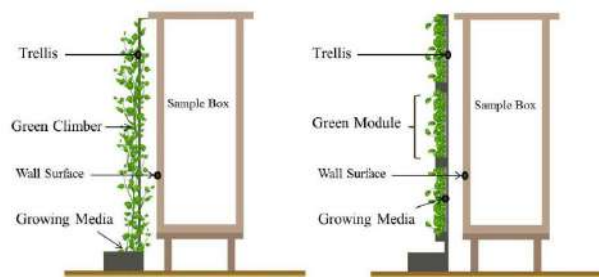
"WVU Miyawaki Mini-Forest." *Whatcom Million Trees Project*, September 13, 2023.

<https://whatcommilliontrees.org/tree-projects/tree-planting/wvu-miyawaki-mini-forest/>.



**Figure 17 Process of installing a Vertical Farm**

Naskali, A. Teoman, Ozgun Pinarer, and A. Cagri Tolga. "Vertical Farming: Under Climate Change Effect." *Environment and Climate-smart Food Production*, March 18, 2021, 259–84. [https://doi.org/10.1007/978-3-030-71571-7\\_8](https://doi.org/10.1007/978-3-030-71571-7_8).



**Figure 18 Section of a Green Façade Application**

sciencdo\_. "Thermal Impacts of Vertical Greenery Systems." *Sciencdo*, March 3, 2015.

<https://sciencdo.com/article/10.1515/rtuct-2014-0007>.



**Figure 19 Usage of Solar Energy in Architecture**

"Solar Building Design - Architectural Resources - NY Architects & Planning Firm." *Architectural Resources*, July 20, 2022.

<https://www.archres.com/solar-building-design/>.

**Figure 20 Twenty-Minute Neighborhood**

The Scottish Government. "Local Living and 20 Minute Neighbourhoods: Planning Guidance." Scottish Government, April 29, 2024.  
<https://www.gov.scot/publications/scottish-government-planning-guidance-local-living-20-minute-neighbourhoods/pages/2/>.

To promote sustainability, the center will use **local materials**, reducing carbon footprints, and implement **green infrastructure**, such as permeable pavements and rainwater harvesting systems, to manage rainfall and prevent flooding. Smart building technologies will optimize energy use, enhancing efficiency and minimizing environmental impact.

The center will also serve as a hub for community interaction, offering cultural events, educational programs, and recreational spaces. By integrating green spaces and eco-friendly features, it will foster a sense of belonging and promote environmental awareness. The project will not only improve urban ecology but also contribute to Belgrade's long-term sustainability goals, acting as a model for future urban development.

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#### CONCLUSION

The community center project in Belgrade will combine green city and green architecture principles to promote sustainability and resilience. It will feature a green roof that helps reduce the urban heat island effect, improve biodiversity, and provide shelter for wildlife. Living plants incorporated into the building's façade will enhance the structure's aesthetics, improve air quality, and aid in stormwater management. Green infrastructure elements, such as permeable pavements, bioswales, and rainwater harvesting systems, will be employed to manage rainfall, reduce runoff, and prevent flooding. Solar panels on the roof will harness renewable solar energy, decreasing the center's dependence on non-renewable energy sources. Additionally, smart building technologies will optimize energy efficiency by monitoring and controlling lighting, heating, cooling, and energy consumption in real time. Sustainable materials, with a preference for locally sourced, recycled, and low-impact options, will be used in construction to minimize the building's environmental footprint.

The community center will encourage social interaction by providing spaces for cultural, educational, and recreational activities. It will act as a catalyst for environmental education, promote community resilience, and help create a more inclusive and sustainable urban environment. This project aims to demonstrate how sustainable architecture can improve the long-term health of both the urban ecology and the quality of life for city inhabitants, making it a model for future urban development in Belgrade. By integrating green roofs, energy-efficient systems, and green infrastructure, the project will help Belgrade meet its long-term sustainability goals.

The center will also serve as a symbol of how modern technology and architecture can be harmoniously integrated with cultural heritage. It will highlight the importance of collaboration between architects, governments, and communities to ensure urban spaces are both environmentally sustainable and meet the diverse needs of their residents. In doing so, the project will address urgent environmental concerns, such as

pollution and urban sprawl, while also fostering walkability and green spaces to create a livable, vibrant urban area. This approach offers a vision for a transformed metropolis that blends modern urban growth with a commitment to sustainability, preserving Belgrade's unique cultural identity while addressing the challenges of rapid urbanization and environmental change.

Drawing on successful examples from other community centers, such as the Watts, Northstowe, and Lubber Run centers, the Belgrade community center will incorporate elements like solar panels, natural lighting optimization, and locally sourced materials to enhance energy efficiency and minimize the environmental footprint. The use of green infrastructure will also support stormwater management and biodiversity. The community center will foster social cohesion and resilience through flexible spaces that can evolve with the needs of the neighborhood. Ultimately, the project will showcase how sustainable urban development can align with both environmental stewardship and the improvement of residents' quality of life, making it a model for future urban planning in Belgrade and beyond.

### REFERENCES

- [1] Aj. "Futuristic Smart City Vision of Paris in 2050 by Ar. Vincent Callebaut." Kadva Corp, July 16, 2018. <https://www.kadvacorp.com/design/futuristic-smart-city-vision-2050/>.
- [2] Arandelovic, Biljana, and Milena Vukmirovic. "Chapter 1: The Urban, Political and Socioeconomic Rise and Fall of Belgrade through Its History." Essay. In *Belgrade: The 21st Century Metropolis of Southeast Europe*, 2020.
- [3] Arandelovic, Biljana, Milena Vukmirovic, and Nikola Samardzic. "Belgrade: Imaging the Future and Creating a European Metropolis." *Cities* 63 (March 2017): 1–19. <https://doi.org/10.1016/j.cities.2016.12.010>.
- [4] Badescu, Gruia, and Wendy Pullan. "Architecture, 'coming to Terms with the Past' and the 'World in Common': Post-War Urban Reconstruction in Belgrade and Sarajevo." *Architecture, "coming to Terms with the Past" and the "World in Common": Post-War Urban Reconstruction in Belgrade and Sarajevo*. Dissertation, University of Cambridge, 2018.
- [5] Borrallo-Jiménez, Milagrosa, María LópezdeAsiain, Rafael Herrera-Limones, and María Lumbreras Arcos. "Towards a Circular Economy for the City of Seville: The Method for Developing a Guide for a More Sustainable Architecture and Urbanism (GAUS)." *Sustainability* 12, no. 18 (September 9, 2020): 7421. <https://doi.org/10.3390/su12187421>.
- [6] Chiarini, Bruno, Antonella D'Agostino, Elisabetta Marzano, and Andrea Regoli. "Air Quality in Urban Areas: Comparing Objective and Subjective Indicators in European Countries." *Ecological Indicators* 121 (February 2021): 107144. <https://doi.org/10.1016/j.ecolind.2020.107144>.
- [7] "Cities Now." *Remaking Cities*, 2017. <https://doi.org/10.5040/9781474224192.ch-001>.
- [8] Durmaz, Özge. "New 'Green District of the Future' to Emerge on Former Factory Site: FSO Park." *Arkitera*, March 4, 2024. <https://www.arkitera.com/en/project/new-green-district-of-the-future-to-emerge-on-former-factory-site-fso-park/>.
- [9] "Educating the Prospective Practitioner: Adapting Architecture Education to Address Future Challenges." *Conscious Cities Anthology* 2018, no. 1 (October 15, 2018). <https://doi.org/10.33797/cca18.01.16>.
- [10] Eib. "Europe and Its Urban Development, 1970 to 2020." *European Investment Bank*, March 29, 2019. <https://www.eib.org/en/essays/the-story-of-your-city>.
- [11] Hirt, Sonia. "Belgrade, Serbia." *Cities* 26, no. 5 (October 2009): 293–303. <https://doi.org/10.1016/j.cities.2009.04.001>.
- [12] "History of the City, Street and Plinth." *The City at Eye Level*, August 3, 2021. <https://thecityateyelevel.com/stories/history-of-the-city-street-and-plinth/>.
- [13] Huseynov, Emir Fikret. "Planning of Sustainable Cities in View of Green Architecture." *Procedia Engineering* 21 (2011): 534–42. <https://doi.org/10.1016/j.proeng.2011.11.2048>.
- [14] Jovanović, Mimir, and Ivan Ratkaj. "Functional Metamorphosis of New Belgrade." *disP - The Planning Review* 50, no. 4 (October 2, 2014): 54–65. <https://doi.org/10.1080/02513625.2014.1007653>.
- [15] Müştak Sevindik, Senem. "Discussion of Spaces as Palimpsest through an Architectural Design Competition Project: The Case of Student City Complex in New Belgrade." *Mimarlık Bilimleri ve*

- Uygulamaları Dergisi (MBUD) 9, no. 1 (July 7, 2024): 510–32.  
<https://doi.org/10.30785/mbud.1410497>.
- [16] Overstreet, Kaley. “Exploring New Urbanism Principles in the 21st Century.” ArchDaily, June 18, 2021. <https://www.archdaily.com/963314/exploring-new-urbanism-principles-in-the-21st-century>.
- [17] Robinson, Jennifer. “The Urban Now: Theorising Cities beyond the New.” European Journal of Cultural Studies 16, no. 6 (August 12, 2013): 659–77. <https://doi.org/10.1177/1367549413497696>.
- [18] Saaty, Thomas, and Pierfrancesco De Paola. “Rethinking Design and Urban Planning for the Cities of the Future.” Buildings 7, no. 3 (August 24, 2017): 76. <https://doi.org/10.3390/buildings7030076>.
- [19] Schaefer, Vincent J. “Some Effects of Air Pollution on Our Environment.” BioScience 19, no. 10 (October 1969): 896–97. <https://doi.org/10.2307/1294714>.
- [20] Seifollahi-Aghmiuni, Samaneh, Zahra Kalantari, Gianluca Egidi, Luisa Gaburova, and Luca Salvati. “Urbanisation-Driven Land Degradation and Socioeconomic Challenges in Peri-Urban Areas: Insights from Southern Europe.” Ambio 51, no. 6 (January 29, 2022): 1446–58. <https://doi.org/10.1007/s13280-022-01701-7>.
- [21] Sicard, Pierre, Evgenios Agathokleous, Alessandra De Marco, Elena Paoletti, and Vicent Calatayud. “Urban Population Exposure to Air Pollution in Europe over the Last Decades.” Environmental Sciences Europe 33, no. 1 (March 7, 2021). <https://doi.org/10.1186/s12302-020-00450-2>.
- [22] Zabel, Thomas, Ian Milne, and Gordon McKay. “Approaches Adopted by the European Union and Selected Member States for the Control of Urban Pollution.” Urban Water 3, no. 1–2 (March 2001): 25–32. [https://doi.org/10.1016/s1462-0758\(01\)00019-x](https://doi.org/10.1016/s1462-0758(01)00019-x).
- [23] Lehmann, S. (2011). Transforming the city for sustainability: The principles of green urbanism. *Journal of Green Building*, 6(1), 104–113. <https://doi.org/10.3992/jgb.6.1.104>
- [24] Sustainable Cities Serbia. Accessed December 28, 2024. <https://documents1.worldbank.org/curated/en/099102023122572634/pdf/P1761920f790520f10995a0f70d5263bdfd.pdf>.