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SUSTAINABLE URBAN DEVELOPMENT POLICIES AND PRACTICES IN THE UNITED STATES[1]

POLITYKA I PRAKTYKA ZRÓWNOWAŻONEGO ROZWOJU MIEJSKIEGO W USA

Tigran Sargsyan

American Studies Center, Yerevan State University 1, Alek Manukyan str., 0025 Yerevan, Armenia,
https://orcid.org/0000-0002-2949-8573, e-mail: tigran.sargsyan@ysu.am

Abstract

Sustainability approaches have a special significance in terms of ensuring a long-term and balanced multi-dimensional urban development. The purpose of the study is to reveal and describe the main features of sustainable urban development in the United States in terms of urban policymaking and practical implementation. In the theoretical part of the paper, various interpretations of sustainable urban development and sustainable cities were discussed and summarized. Meanwhile, a brief description of the current state of global urbanization processes was given. Through secondary data analysis (governmental reports, descriptions of missions and target activities, legislative acts, etc.), comparison and generalization, the main actors (governmental bodies at federal level) and priorities of the U.S. urban policy with a special focus on sustainability were identified and discussed. In addition, the framework of the U.S. sustainable urban development policymaking was suggested and generalized. Different city rankings (based on sustainable development goals, green development, etc.) reveal the leading role of Pacific Coast urban areas, Washington D.C., Boston and New York City in terms of urban sus-

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tainability practices. Various urban innovations are implemented in the same and other urban areas, promoting the further development of smart sustainable city concept in the United States.

Keywords: sustainable urban development (SUD), urban sustainability, sustainable city, smart sustainable city (SSC), U.S.

Streszczenie

Podejścia dotyczące zrównoważonego rozwoju mają szczególne znaczenie w kontekście zapewnienia długoterminowego i zrównoważonego, wielowymiarowego rozwoju obszarów miejskich. Celem badania jest ujawnienie i opisanie głównych cech zrównoważonego rozwoju obszarów miejskich w USA pod kątem kształtowania polityki miejskiej i jej praktycznego wdrażania. W części teoretycznej artykułu omówiono i podsumowano różne interpretacje zrównoważonego rozwoju miast i zrównoważonych miast. Dokonano również krótkiego opisu aktualnego stanu procesów globalizacji urbanizacji. Poprzez analizę porównawczą danych wtórnych (raporty rządowe, opisy misji i docelowych działań, akty legislacyjne itp.) zidentyfikowano głównych aktorów (organy rządowe na poziomie federalnym) oraz priorytety polityki miejskiej USA, ze szczególnym uwzględnieniem zrównoważonego rozwoju. Zaproponowano i uogólniono ramy polityki zrównoważonego rozwoju obszarów miejskich w USA. Różne rankingi miast (oparte na celach zrównoważonego rozwoju, rozwoju ekologicznym itp.) ujawniają wiodącą rolę obszarów miejskich na wybrzeżu Pacyfiku, Waszyngtonu, Bostonu i Nowego Jorku pod względem praktyk zrównoważonego rozwoju w miastach. Na tych oraz innych obszarach miejskich wdrażane są różne innowacje miejskie, promujące dalszy rozwój koncepcji inteligentnego, zrównoważonego miasta w Stanach Zjednoczonych.

Słowa kluczowe: zrównoważony rozwój miast, równowaga ekologiczna miejska, zrównoważone miasto, inteligentne zrównoważone miasto, USA.

INTRODUCTION

Rapid urbanization is among the essential global trends of human development in the 21st century, with more than half of the world's total population living in urban areas. It provides opportunities and a great variety of sustainability challenges (in terms of environmental safety, social justice and inclusion, good governance and economic development).

Sustainable urban development (SUD) has emerged at the interface of the concepts of sustainability and urbanization. It can be considered as a logical response to the global urbanization trends and challenges, aimed at the balance of economic, social, and environmental priorities in terms of creating more livable and resilient cities. Accordingly, SUD studies are gaining more theoretical and practical (applied) significance.

With an urban population of around 280 million and continuous urban growth, the U.S. is home to a number of large urbanized areas basically along the Atlantic and Pacific coasts. Apart from remarkable quantitative parameters of urban development in the U.S., urbanization has a special socio-economic and cultural significance for the country's population in terms of popular types of lifestyle, activities, etc. It goes without saying that American urbanization and urban culture have a unique place in the context of global urban history and development. Meanwhile, the aforementioned current trends and issues of global urbanization are proving a clear need for long-term and future-oriented urban development approaches in the U.S.

The aim of the paper is to discuss the main features of sustainability implications into the U.S. urban policy, as well as relevant cases. Therefore, the following objectives were suggested:

- To discuss and summarize the main theoretical ideas (definitions, meaning, urgency and adjacent concepts) of SUD;
- To reveal and discuss the main features of the U.S. urban policy (framework, levels and directions, priorities, implementation) with a particular focus on urban sustainability issues and priorities, as well as the current peculiarities of urbanization in the U.S.;
- To analyze and summarize urban sustainability approaches in the U.S. by certain case studies (examples of sustainable cities) and sustainable city ranking systems.

Based on the aforementioned objectives, the general research question of the paper can be defined as follows: what are the policy priorities and relevant practical implementations in the context of ensuring SUD in the U.S.?

The broader (general) research framework is SUD as an outcome of implementation of sustainability approaches and principles into urbanization processes. The particular (specific) framework includes the U.S. policy framework and best practices of SUD.

As the study is not empiric but theoretical, the following main research methods were used to achieve the objectives: secondary data analysis (statistical data, reports and evaluations, academic papers, books, legislative acts, etc.), synthesis and generalization, case studies of SUD and sustainable cities in the U.S., quantitative data use, mainly as of 2022–2023 (global and American urbanization statistics).

UNDERSTANDING SUD: THEORETICAL PROVISIONS

Contemporary urbanization and the need for sustainability implications

According to the United Nations statistical database, around 4.6 billion people worldwide lived in towns or cities (about 57% of the total population of the world) in the mid-2023. The total urban population of the world is expected to reach around 5.2 billion (60% of the global population) by 2030 (The Largest Cities Worldwide, 2023).

The dynamics of both urban and rural population growth in the world since 1950 including forecasts by 2050 are shown in Fig. 1.

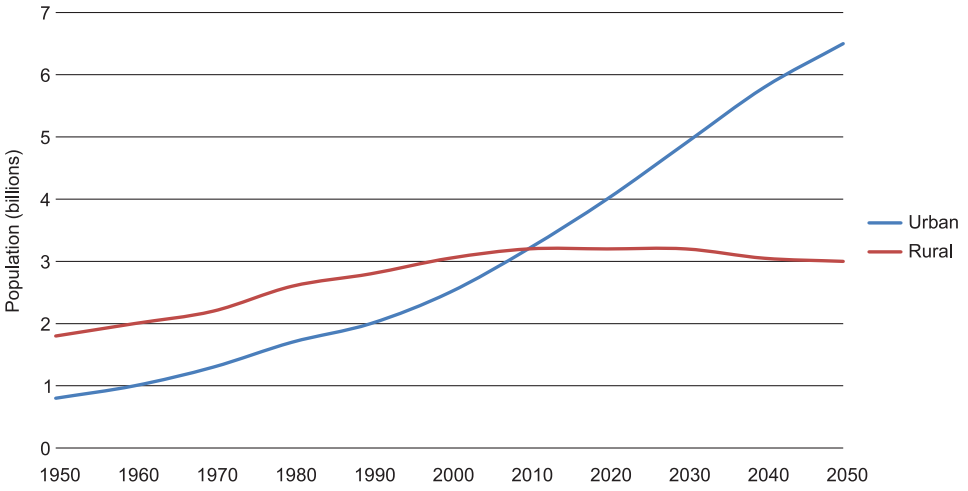

Fig. 1. Urban and rural population growth
Source: own work based on Urban and Rural Population of the World (1950–2050) data.

The rapid rates of urbanization are causing a variety of sustainability challenges worldwide. These challenges include, but are not limited to, inadequate urban infrastructure, total and per capita housing shortages, environmental pollution (particularly, air and water), traffic congestions, social inequality, etc. Rapid urbanization results in sprawling and densely constructed cities, vehicle-dependent cities with high energy consumption and greenhouse gas emissions, contributing to environmental degradation and climate change (UN-Habitat, 2020).

Along with the aforementioned processes, a number of specific types of urbanization have emerged, such as the so-called 'fake urbanization' in economically less developed countries (rapid sprawl and expansion of badly maintained suburb areas with high levels of poverty and unemployment, inadequate sanitary condi-

tions, security and safety challenges, etc.), suburbanization (further development of adjacent areas of larger cities due to better environmental conditions, lower living and rental costs), etc.

Accordingly, sustainability-based approaches in the spheres of urban planning and development are getting a particular urgency and significance, as a crucial precondition towards ensuring a balanced and long-term urban development and sustainability (based on the clean environment, social justice and inclusion, economic development, cultural diversity and tolerance, etc.). Therefore, the main theoretical provisions and ideas of SUD will be discussed in the following part of the given section.

The meaning and definitions of SUD and sustainable cities

Historically, the emergence of the ideas of urban sustainability is connected to the Brundtland Commission report (1987) and the United Nations Earth Summit (Rio de Janeiro, 1992). Afterwards, the Habitat Conference in 1996 was focusing on the consequences of urban development (life quality changes, environmental impact, etc.). The European Council held a major conference of cities and towns in Europe at which the Aalborg Charter (1994) was adopted, indicating the need for establishing a participatory process clearly. The report of European Commission's expert group on the urban environment in 1996 proposed an aim of reversing the present negative relationships between economic growth on the one hand and environmental conditions and the quality of life on the other. It expressed the need to integrate economic, social and environmental policy objectives, and the importance of integration and partnership mechanisms for urban development and management (Sustainable Urban Development, vol. 1, 2006).

Agenda 21, an action program developed during the Earth Summit in 1992, was focusing on sustainable human settlements, integrated land management, waste and sanitation, as well as empowerment of local authorities. The Plan for the Implementation of Agenda 21 was referring to the role of settlement in achieving sustainable development goals both at global and local levels, intensification of international cooperation and implementation of pro-poor land-use planning and service management (Tsenkova, 2005).

SUD can be defined as development that meets the needs of a community without compromising the ability of future generations to meet their own needs. It prioritizes economic, environmental and social sustainability. Sustainable development aims to ensure that cities are livable and supportive of economic, social and ecological resilience in the face of a changing climate (Hager, 2023).

It should be noted that SUD cannot be referred to physical resources and the environment only. The balance and linkages between economic and social frame-

works, as well as between an improved environment and employment in urban areas are crucial. Therefore, the following directions or components of SUD can be distinguished:

- Urban social development (including wealth generation, desegregation, promoting participation, etc.);
- Urban economic growth (referring to both formal and informal sectors, including stimulating, city marketing, labor exchange, supporting survival strategies, etc.);
- Environmental management, focusing on long-term environmental sustainability, renewable resources use, green development agenda, etc. (Towards Sustainable Urban Development: A Strategic Approach).

The aforementioned ideas are clearly in line with the key principles of SUD, indicated in the UN Sustainable Development Goals report. These principles include: promoting efficient urban forms, enhancing resource efficiency, fostering social cohesion, and preserving natural ecosystems within urban areas (The Sustainable Development Goals Report, 2018).

Discussing SUD as a continuous process, its results and outcomes should be taken into account as well. Urban sustainability is considered to be the pivotal final outcome of SUD: in a simplified way, it could be described as a state of a dynamic harmony and balance of social, economic and environmental priorities of urban development. Therefore, sustainable cities are the cities which have achieved and continuously maintained such kind of harmony or balance. However, there is no generally agreed definition of sustainable city yet.

Prasad and Bansal (2015) have summarized and studied several theoretical provisions of urban sustainability, in particular:

- The definition by Rees (1987), as "development which ensures that the utilization of resources and the environment today does not damage prospects for their use by future generations";
- The definition by Barbier (1987), as "the primary objective is reducing the absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural disruption, and social instability" (Prasad, Bansal, 2015).

Based on the Brundtland definition of sustainable development (1987), a sustainable city should meet the needs of the present city population without sacrificing the ability of future generations to meet their own needs. It is often described as a city with the minimum environmental impact, managed and inhabited by people dedicated to the minimization of required inputs of energy, water and food, as well as outputs of heat, waste and pollution. In this context, a sustainable city is often referred to "ecocity": a term suggested by Register in 1987. The concept of sustainable city was initially envisioned by Paul F. Downton, Timothy Beatley

and Steffen Lehmann (Chan et al., 2016). Another approach is that a sustainable city should promote the active participation of its civil society in urban planning and development of cities as the means to satisfy their needs (Khair et al., 2020).

It goes without saying that because of a great diversity of SUD directions and priorities, an integrated planning approach is required in terms of achieving urban sustainability. Therefore, the integrated approach should be based on the following priority areas: economy, environment and ecology, land use, society/community, climate change, carrying capacity-based development planning, transportation, governance, etc., simply merged into four dimensions: economic, social, environmental and planning (Bhargava et al. 2020).

Summarizing various interpretations of SUD urgency, it can be also discussed according to the aforementioned three main aspects: environmental, social and economic (Table 1).

Table 1. Different aspects of SUD urgency

Aspects	Description
Environmental sustainability	reducing urban sprawl, preserving natural habitats, decreasing possible urban environmental impacts of urbanization (particularly, air and water pollution) and promoting environmental resilience of cities
Social equity and inclusion	providing affordable housing, access to basic services, and opportunities for decision-making, decreasing poverty and assisting vulnerable population
Economic prosperity	cities can create jobs and attract investments via investing in sustainable infrastructure, green technologies and innovation

Sources: Angel et al. (2011), UN-Habitat (2016), OECD (2019), UNDRR (2019).

To sum up, the process of SUD can be shown in a simplified way through the input-process-output model, as a result of applying sustainability principles and approaches to urbanization processes in order to best meet the needs of present and future generations.

Generally, the urgency of SUD could be determined by the necessity of overcoming the urban degrowth processes as well. According to Florentin (2018), degrowth in cities is a new urban reality, requiring relevant urban planning toolkit and posing new challenges for local governments and other actors involved in urban development (enterprises, users, etc.). It is based on four spirals: demographic, urban shape, public finances and socio-economic (Florentin, 2018).

Meanwhile, critical views on SUD should not be forgotten as well. Particularly, Krähmer (2020) has argued the efficiency of SUD strategies in terms of urban degrowth: specifically, the idea of decrease of environmental impact along with economic growth (Krähmer, 2020). Indeed, it is not surprising, since the concept

of sustainable development includes several aspects that are completely different in their content, with a high possibility of conflicts and contradictions (such as environmental and economic aspects).

Summing up the theoretical provisions of SUD, the main patterns of the U.S. urban policy with a certain focus on urban sustainability will be discussed in the next section of the paper.

AN OVERVIEW OF THE U.S. URBAN POLICY IN THE CONTEXT OF SUD

According to World Bank data, more than 83% of the total U.S. population (i.e. around 280 million people) is living in urban areas (Urban population % of the total population-United States, 2022). Historically, the U.S. was one of the earliest industrialized nations; thus, it had a comparatively high urbanization rate during the past two centuries. The urban population exceeded the rural population during the 1910s, and by the middle of the 21st century it is expected that almost 90 percent of the population will live in urban areas (O'Neill, 2024).

Figure 2 shows the dynamics of the urban and rural population in the U.S.

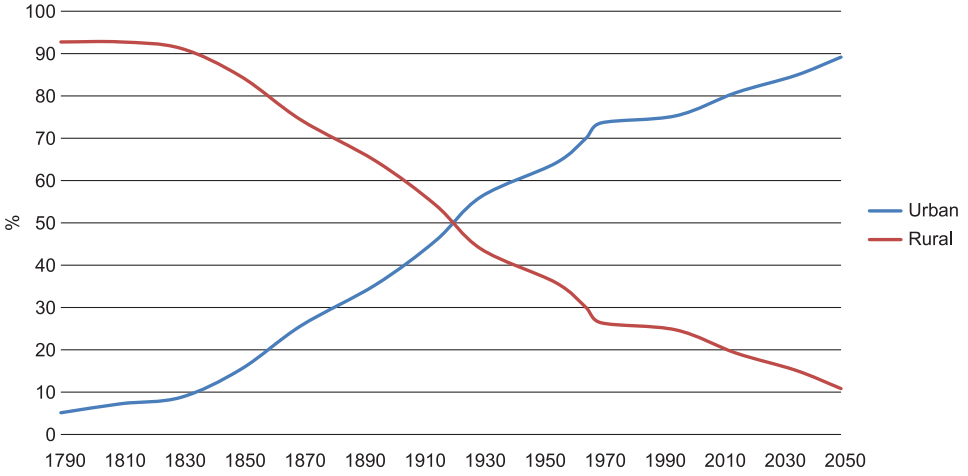

Fig. 2. Urban and rural population percentage dynamics in the U.S.
Source: own work based on Degree of urbanization in the United States from 1790 to 2020, and with projections until 2050 data.

Currently, the most populated cities in the U.S. are New York City (more than 8.3 million), Los Angeles (around 3.8 million), Chicago (above 2.6 million) and Houston (2.3 million), followed by Phoenix, Philadelphia, San Antonio, San Diego and Dallas (Top 25 cities in the U.S. with the highest resident population in 2022). With adjacent neighborhoods, American cities are making urban agglomerations

or core-based statistical areas (CBSA). When the population of the core city is at least 100,000 people with surrounding communities, the CBSA is becoming to metropolitan statistical area (MSA, metropolitan area). Two or more adjacent CBSAs with essential interactions are making single urban units called combined statistical areas (CSA). A large CSA with two or more MSAs is considered to be a conurbation (Montello et al., 2021). Spatially, two huge urbanized areas have been formed in the U.S.: along the Pacific Coast (from San Diego to San Francisco) and the Megalopolis region along the East Coast.

As was discussed in the theoretical part of the paper, SUD itself is a multi-sector and multi-dimensional phenomenon, including social, environmental, economic, cultural and institutional priorities of urban development. Therefore, SUD policymaking should be a complex and multi-agency process, according to the great diversity of development priorities and challenges.

Based on the current state of the U.S. urban policy, the following conclusions are made:

- There is still no national-level common and unified urban policy: undoubtedly, this is an essential challenge towards ensuring a comprehensive SUD policymaking (in terms of proper development planning, coordination and systemization of activities, outcomes, etc.);
- However, there is a variety of federal multi-sector (environmental, economic, etc.) and multi-agency (involving different governmental agencies) initiatives;
- Federal initiatives are successfully combined with state and local level initiatives and efforts.

Table 2 reveals the main federal-level 'actors' involved in SUD policymaking in the U.S. directly or indirectly, as well as the main aspects of their potential contribution to urban sustainability.

Table 2. Examples of federal-level policy involvement in the U.S. urban sustainability

Federal government bodies	Urban sustainability competencies and contributions
Environmental Protection Agency (EPA)	regulating environmental issues and promoting sustainability initiatives at federal level
Department of Housing and Urban Development (HUD)	ensuring sustainable and affordable housing, promoting urban revitalization
Department of Transportation (DOT)	working on transportation infrastructure projects, including alternative transportation options
Department of Energy (DOE)	promoting energy efficiency and renewable energy initiatives
Department of the Interior	managing public lands and natural resources

Source: own study.

The agencies are involved in several joint activities aimed at urban capacity building and coordination in the sphere of SUD. Table 3 presents some of the above-mentioned main federal initiatives (with involvement of DOT, HUD, EPA, etc.).

Table 3. Examples of federal initiatives towards SUD in the U.S.

Initiatives	Description
Strong Cities, Strong Communities (SC2)	strengthening capacity of distressed cities to achieve economic development goals, coordinating federal programs and investments to promote economic growth in distressed areas and establish fruitful cooperation between community organizations and federal government
Partnership for Sustainable Communities (PSC)	coordinating federal housing, transportation, water and infrastructure investments to make neighborhoods more prosperous and environmentally safe; initiative is based on six principles: 1) to provide more transportation choices, 2) to promote equitable and affordable housing, 3) to enhance economic competitiveness, 4) to support existing communities, 5) to coordinate and leverage federal policies and investment, 6) to value communities and neighborhoods
Neighborhood Revitalization	helping local communities to revitalize neighborhoods with concentrated poverty into areas of opportunity; initiative is cross-department and interagency, best practices are shared through the White House Neighborhood Revitalization Report
Choice Neighborhoods	catalyzing improvements and transformations in neighborhood assets and reconstruction plans, including vacant property, housing, services and schools, private developments, etc.
Promise Zones	designating high-poverty urban, rural and tribal communities that will receive private and public funds to create jobs, leverage investments, increase economic activities, expand educational opportunities, and reduce violent crime rates

Source: The State of National Urban Policy in the United States (2017).

Along with governmental initiatives, the presidential involvement has a great significance in the framework of SUD policy as well. Particularly, Executive Order 13514 (EO 13514) issued by President Barack Obama in 2009 was aimed at sustainability transformations of buildings including energy efficiency and renewable energy development, reducing greenhouse gas emissions, water consumption, etc.

EO 13514 was replaced by Executive Order 13693 (EO 13693) in 2015 (entitled 'Federal Leadership on Climate Change and Environmental Sustainability'). Among the planned activities, EO 13693 is focused on ensuring 25% of total energy consumption from clean energy sources by 2025, reducing energy use in federal buildings by 2.5% annually between 2015 and 2025, and reducing water intensity in federal buildings by 2% per year through 2025 (Federal Leadership on Climate Change and Environmental Sustainability, 2015).

After discussing the SUD policy features and framework, the following section will address the relevant examples and best practices of sustainable cities in the U.S., as well as sustainability ranking approaches.

SUSTAINABLE CITIES IN THE U.S.: RANKINGS, PRACTICES AND EXAMPLES

In order to shape an overall understanding of the urban sustainability level, a complex and integrated methodological approach is required. The system of sustainable development goals (SDGs) and indicators can be considered as a relevant framework for comprehensive urban sustainability assessment.

The U.S. Cities SDG Index ranks 100 MSAs according to 49 indicators across 16 SDGs. Each indicator is scaled from 0 to 100, with 100 being the best possible score and 0 the worst. As of 2017, the top 10 of MSAs by SDG index includes: 1 San Jose-Sunnyvale-Santa Clara (California); 2 Provo-Orem (Utah); 3 Seattle-Tacoma-Bellevue (Washington); 4 San Francisco–Oakland–Hayward (California); 5 San Diego-Carlsbad (California); 6 Albany-Schenectady-Troy (New York); 7 Boise City (Idaho); 8 Oxnard-Thousand Oaks-Ventura (California); 9 Boston-Cambridge-Newton (Massachusetts-New Hampshire) and 10 Portland-Vancouver-Hillsboro (Oregon-Washington) (Praksh et al., 2017).

According to the most recent available index values (2019), the top 10 has changed by 40% compared with 2017 (six MSAs from the previous list have been ranked in top 10 again) and included the following MSAs: San Francisco-Oakland-Hayward (California); San Jose-Sunnyvale-Santa Clara (California); Washington-Arlington-Alexandria (D.C.-Virginia-Maryland-West Virginia); Seattle-Tacoma-Bellevue (Washington); Madison (Wisconsin); Portland-Vancouver-Hillsboro (Oregon-Washington); San Diego-Carlsbad (California); Boston-Cambridge-Newton (Massachusetts-New Hampshire); Austin-Round Rock (Texas); Raleigh (North Carolina) (The 2019 U.S. Cities Sustainable Development Report, 2019)

Apart from the overall index values, the top 10 lists of MSAs by each of the SDGs have been calculated in the reports. In order to reveal the correlations between different SDGs, a number of top 10 lists were compared. The aim was to show the percentages of matches (repetitions) between the lists of highest scores by certain SDGs.

There is a 60% correlation between the top 10s of SDG 1 (No poverty) and SDG 3 (Good health and well-being). The correlation of SDG 7 (Affordable and clean energy) still keeps being low with SDG 1 (20% match) and SDG 3 (10% match).

The top scores of SDG 13 (Climate action) and SDG 8 (Decent work and economic growth) did not match at all, while there is 30% match between SDG 13 and SDG 10 (Reduced inequalities), and a 20% match between SDG 10 and SDG 8.

SDG 4 (Quality education) has recorded 20% matches with both SDG 8 and SDG 15 (Life on land), while there was a 0% match between the highest scores of SDG 8 and SDG 15.

Thus, despite achievements of certain cities by particular SDGs, there is still much to do for ensuring a truly balanced, comprehensive and multi-pillar urban sustainability. Significant differences between the top-rank lists of cities by different SDGs are a clear evidence of that.

Apart from SDG-based urban sustainability reports, several other green and sustainable rankings of the U.S. cities are noteworthy as well.

In the U.S., public and private decision-makers use national indicators as well, and these are:

- The STAR[2] Community Index around sustainability issues, based on 81 goals (referring to the environment, economy and society). It was constructed by ICLEI[3] – Local Governments for Sustainability USA in cooperation with the U.S. Green Building Council, the National League of Cities, and the Center for American Progress.
- The Green City Index, developed by Siemens in collaboration with the Economist Intelligence Unit, focuses on the environment. In the U.S., San Francisco, New York, Seattle, and Denver were identified as the most sustainable cities out of the 27 cities considered (Birch, Lynch, 2012).

According to Realty Hop ranking, the top 10 of the greenest U.S. cities for homebuyers include: 1. Portland; 2. Washington D.C.; 3. San Francisco; 4. Seattle; 5. Oakland; 6. Spokane; 7. New York; 8. Sacramento; 9. San Diego; 10. San Jose. Accordingly, 8 of the 10 greenest cities are on the West Coast, mainly in California (five cities). The report evaluated each city based on the following criteria: sustainability; policy and infrastructure; energy; environment; affordability (Fernandez, 2024).

Summarizing the main green and SUD dimensions of the top three of the ranking (Portland, Washington D.C. and San Francisco), the following most common priorities can be mentioned: promoting renewable energy development; promoting sustainable transportation initiatives (including the wide use of bicy-

[2] Sustainability Tools for Assessing and Rating.
[3] International Council for Local Environmental Initiatives.

cles); decreasing carbon emissions and environmental impact; greening; recycling and sustainable waste management (Greenest Cities in America, 2024).

The LawnStarter ranking of the most sustainable cities of the U.S. was based on the factors merged into five main categories: policy (renewable energy and efficiency incentives, waste regulations, etc.); sustainable development (zero-energy and green buildings, recycling facilities, etc.); pollution (greenhouse gas emissions, fuel consumption, population density, etc.); transportation (consumer expenditures on gasoline and transportation, electric vehicle charging stations, etc.) and food production (urban gardening, local stores and restaurants offering sustainably certified products, etc.). The data was collected for 500 largest U.S. cities. The top 10 of the best overall scores are: 1. New York; 2. Los Angeles; 3. Chicago; 4. San Francisco; 5. San Diego; 6. Portland; 7. Boston; 8. Seattle; 9. Sacramento; 10. San Jose (Maive, 2024).

The Natural Resources Defense Council (NRDC), a U.S.-based international environmental advocacy group is prioritizing the following activities towards ensuring urban sustainability in the U.S.: electrification and better energy efficiency of buildings (San Jose, Seattle, Boston, etc.), electrification of transportation (Chicago, St. Louis, Orlando, etc.), enhancing sustainable transportation options (Honolulu, San Diego, St. Paul, etc.), supporting community development and housing affordability, addressing water scarcity (Los Angeles, New York City), etc. (Sustainable Cities, www.nrdc.org).

For better networking and promotion in the sphere of SDGs and their implementation at global level, Sustainable Development Solutions Network (SDSN) was established in 2012. With around 1,900 member institutions, SDSN is serving as an umbrella for dozens of country-level (national) and regional initiatives and networks as well.

SDSN USA is a network of universities and research institutions committed to achieving the UN Sustainable Development Goals in the U.S. Therefore, SDSN USA is taking the following actions:

- Facilitating and leading coalitions to address U.S. sustainability challenges;
- Building sophisticated and practical systems for assessing progress;
- Facilitating public awareness, education, and engagement;
- Linking these efforts with policymakers and community leaders (www.sdsnusa.org).

From 2014–2017, the U.S. Sustainable Cities Initiative (USA-SCI) supported SDG achievement strategies in three cities (New York, Baltimore and San Jose) through sustainable development planning efforts which have served as models of SDG-based urban development strategies worldwide (USA-SCI).

Meanwhile, the essential impact of Information and Communication Technologies (ICT) on global urbanization processes should be taken into account when discussing SUD cases and practices in the U.S. It goes without saying

that the use of urban innovations, such as Internet of Things (IoT) and other types of ICTs, is an important aspect of contemporary SUD. It is followed by the further development of smart sustainable cities (SSCs): a symbiosis of smart cities and sustainable cities using urban innovations for ensuring urban sustainability.

SSCs are innovative cities that use ICTs to improve the life quality, efficiency of urban operation and services, meeting the needs of present and future generations with respect to economic, social, environmental and cultural aspects (Smart Sustainable Cities, www.unece.org)

The most popular examples of American smart cities are New York City (New York), Chicago (Illinois), San Francisco (California), Austin (Texas), Columbus (Ohio), Dallas (Texas), Seattle (Washington), Charlotte (North Carolina), Washington D.C., Boston (Massachusetts), Pittsburgh (Pennsylvania), Boulder (Colorado), San Jose (California), etc. (Locke, 2022).

Analyzing the best practices of the use of urban innovations for ensuring urban sustainability in the aforementioned cities, the following directions of implications are identified: increasing the quality of public services, environmental monitoring, monitoring of resource, water and electricity use, smart transportation, decreasing the negative environmental impact, etc.

CONCLUSIONS AND DISCUSSION

Summarizing the paper, both theoretical and practical (case-based) conclusions were made in accordance with the research objectives indicated in the introductory section.

There is still a lack of final and unified definitions of SUD and sustainable cities: it can potentially result in further misinterpretations and overlaps (especially, in terms of policy planning, practical implementation, assessment, etc.). However, a number of general and relatively inarguable provisions can be suggested, such as:

- SUD is a continuous process and sustainable cities are its main final outcomes;
- SUD is the process of implementation of sustainability ideas into urban planning and development: theoretically and methodologically, SUD is located at the interface of sustainable human development and urbanization concepts;
- SUD is a complex and multi-dimensional phenomenon based on three main pillars: social, economic and environmental. However, it is worth considering political and institutional (good urban governance for sustainability), demographic and cultural aspects more deeply to best meet the criteria of overall urban sustainability.

The necessity and urgency of SUD should be discussed in the context of ongoing quantitative and qualitative patterns of global urbanization.

Quantitative data study reveals the high rates of urban growth nowadays (around 5.7 times more, compared with 1950). The urban population is forecasted

to be around seven billion by the year 2050 (around 1.5 times more, compared with 2023). In turn, the rapid quantitative growth is (and will be) directly correlated with qualitative deterioration processes (environmental, social, economic, institutional, etc.).

Ideally, SUD policy should be a multi-agency, multi-vector and multi-sector activity, covering the whole range of priorities and challenges of SUD. On the other hand, the broad content and framework of SUD is causing additional challenges towards ensuring a proper policymaking and coordination. The efficiency of combining especially environmental and economic development strategies (probably the most differing aspects of sustainable development in terms of conflicts and contradictions) has been argued and criticized.

The special importance of SUD and relevant policymaking in the U.S. could be determined by the following main factors:

- The U.S. is one of the earliest urbanized nations; hence, the special socio-economic and cultural role of urbanization in the U.S., and the role of the U.S. in global urban development;
- The country has remarkable quantitative urban parameters; more than 83% of the U.S. population is urban. Furthermore, around 6% of the global urban population is living in the U.S.;
- The U.S. is among the top contributors to global greenhouse gas emissions (with a significant share of urban-related sources: industry, residential, transportation, etc.).

The U.S. urban policy includes a great diversity of multi-sector and multi-agency initiatives and activities at different levels: federal, state and local. Besides, several presidential executive orders issued between 2015 and 2019 have been aimed at ensuring sustainability of urban buildings through reducing water and energy consumption and greenhouse gas emissions. The main federal government bodies involved in SUD policies and initiatives directly or indirectly are the following: Department of Housing and Urban Development, Department of the Interior, Department of Transportation, Department of Energy, and Environmental Protection Agency. Accordingly, the target sectors or directions of SUD policy in the U.S. are: environmental sustainability and green initiatives, management of public lands and natural resources, ensuring energy efficiency and wide use of renewables, affordable housing conditions for urban inhabitants, revitalization of urban areas and promoting sustainable construction and planning approaches, developing alternative and eco-friendly transportation, infrastructure, and so on.

However, the lack of unified national policy increases the risks of possible conflicts and overlaps between sector-based initiatives, activities and policies, responsibilities, missions, etc. Therefore, it may affect the efficiency of activities and final outcomes negatively. Therefore, it is highly desirable to shape a comprehensive

framework for national urban policy at federal level, as an 'umbrella' and coordinating platform for multi-sector and multi-institutional activities.

At local level, SDG-based index for the U.S. cities can be seen as a successful example of comprehensive SUD assessment. On the other hand, a comparison of top 10 city lists by certain SDGs shows a low to average level of correlation: particularly, between clean and affordable energy, good health and wellbeing, and poverty reduction, climate action and economic growth, economic growth and reduced inequalities, quality education and decent work, etc. This could be considered as a kind of imbalance between different pillars of SUD and an evidence of possible contradictions between the undertaken activities.

Several other green and sustainability city rankings reveal the leading role of Pacific Coast in terms of SUD (San Francisco, Portland, Seattle, Los Angeles, San Jose, San Diego, etc.), as well as the achievements of New York City, Washington D.C., Chicago, Boston, etc. The most common SUD approaches include renewable energy development, eco-friendly transportation, greening and gardening, decreasing carbon emissions, zero-energy buildings, recycling, etc.

Meanwhile, SUD in the U.S. is based on the wide use of ICT-based urban innovations for sustainability: particularly, the use of online platforms and digital toolkits for monitoring purposes (environmental impact, water, electricity and resource use, traffic), increasing the quality and accessibility of public services, etc. Relevant case studies reveal the inarguable efficiency of urban innovations for ensuring urban sustainability.

Smart sustainable urban development and then SSCs are likely to gradually replace the concepts of SUD and smart cities, given the increase in urban innovations and their contribution to urban sustainability. Therefore, it is highly recommended that SSCs should be better integrated into the U.S. SUD policies (this is not yet clearly visible in the federal initiatives mentioned).

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