

CITY VS. CLIMATE CHANGES - THE FUTURE AND ITS (UN)SUSTAINABILITY: THE GLOBAL APPLICABILITY OF SARRIGUREN AND JÄTKÄSAARI?

Aleksandra Stupar¹, University of Belgrade, Faculty of Architecture, Belgrade, Serbia
Zoran Nikezić, University of Belgrade, Faculty of Architecture, Belgrade, Serbia

The global reality, intensively exposed to the challenges caused by climate changes, demands new ideas, methods and tools which could eventually prevent or mitigate the consequences of carbon emissions. Therefore, the contemporary cities, as focal points of the new global comprehension, have become testing grounds for numerous initiatives based upon imperatives of sustainability, environmental consciousness, energy efficiency and 'green' life style.

In Serbia, experience in matters of the built environment has had a tendency to be formed exclusively on the basis of authentic local initiatives, aspirations, successes and failures. In the global effort for sustainable development, considering the commitments imposed by climate change and carbon emission, a greater reliance on results achieved elsewhere would be a welcome change. Consequently, this article will present and comment two eco-driven projects – Sarriguren and Jätkäsaari, both covering a wide range of useful ideas, intriguing concepts and globally applicable solutions for the challenges caused by climate shifts.

Key words: climate change, cities, carbon emission, energy efficiency, sustainability.

INTRODUCTION

Balancing between an accelerating urban development and a need to prevent further global warming, contemporary cities have been facing the consequences of carbon intensive modes of living. The importance of environmental, economic and social imperatives has been emphasized but their real influence on our living environment and low-carbon future has still to be confirmed. The numerous large and small-scale examples of the environmentally friendly practice definitely represent a valuable source of information and applied knowledge, but their most important outcome should be a profound transformation of global and individual environmental consciousness reflected in lifestyle, consumption patterns and energy transition.

Circumstances existing in Serbia, with an uneven distribution of social capital and a questionable political and financial potential for dealing with problems that are not seen as an immediate treat, might lead us to conclude that all efforts of

copping with climate change will fail. Initiatives are complicated to organize, concepts and solutions difficult to agree upon, and comprehensive projects (bottom-up and/or vice versa) almost impossible to implement (Vujošević, 2010).

THE SUSTAINABLE PATH OF CONTEMPORARY ECO-TRENDS

The concept of sustainability, although recently upgraded by new paradigms, concepts and frameworks, has been frequently misinterpreted and/or misunderstood due to its broad and vague definition(s). Numerous mile-stone summits and agreements focused on global sustainable development remained in a domain of resonant political statements, while their implementation still lags behind. From the "United Nations Conference on the Human Environment" (Stockholm, 1972), the Brundtland Commission (1987), the Rio summit (1992), Rio+5 (New York, 1997) to Rio+10 (Johannesburg, 2002), Kyoto (1997, 2005) and COP15 (Copenhagen, 2009) different concepts related to a number of sustainable, 'eco' and energy issues have been launched in order to reduce GHG emissions and

create an acceptable level of environmental (e)quality. Consequently, UN Habitat has identified eight globally implemented innovations which, in a long run, should improve a current condition of environment and support further sustainable development. These innovations are related to a development of carbon-neutral cities, renewable energy, eco-efficiency, distribution of power and water systems, but they also tackle the issues of transportation, urban infrastructure, public spaces, photosynthetic spaces and slum areas (UN Habitat, 2009).

Nowadays, the label of eco/sustainable cities, which was coined by Richard Register (1987), is recognized as a competitive advantage and an expression of civilization progress, but it still represents an ambivalent category – depending on the preferred level and scope of integration with/in the biosphere, or the imposed framework (global, regional, local/ civic). According to

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¹ Bul. kralja Aleksandra 73/II, 11 000 Beograd, Serbia
stupar@afrodita.rcub.bg.ac.rs

Capello et al. (1999, p. V) a sustainable city is a concept of an urban agglomeration able to ensure 'environmentally benign development' and to achieve an equilibrium between 'economic progress, social equity and environmental quality'. It also describes an introverted, city-oriented model of continuity which is focused on the future of existing urban structures and guided by effective and comprehensive local policy-making (Capello et al., 1999).

Downton (2009) further develops the idea of a sustainable/eco city suggesting an improved and extroverted concept – the Ecopolis, which represents an 'urban system consciously integrated into the process of the biosphere with the intent of maintaining the optimum functioning of the biosphere for human purposes' (Downton, 2009, p.75).

Following the latest theoretical speculations, the contemporary cities trace their sustainability by projects which often include elements of utopian visions (Callenbach, 1975; Calthorp, 1993; Downton, 2009 etc.). The scale, scope and ambitions of these initiatives can vary, as well as the type of applied innovation or the level of sustainability, but we can distinguish three main groups of actions which are supposed to overcome problems generated by climate shift:

- new 21st century cities – as large-scale urban/social experiments (for ex. high-tech eco-cities Masdar, Dongtan, Tianjin);
- urban (re)development projects – as limited/small scale urban/social experiments (Ecocity Sarriguren, Ithaca EcoVillage, Malmö's neighbourhoods Augustenborg and the Western Harbour area, the proposal for the Jätkäsaari Climate Neutral District in Helsinki etc.);
- global and local initiatives – focusing on knowledge transfer, dissemination of practice, networking, institutional and financial international support (for ex. C40 Cities, Transition Towns, Climate Alliance of European Cities, the EcoCity project in India, 'UN-HABITAT Cities and Climate Change Initiative').

SEARCHING FOR A UNIVERSAL SOLUTION

Due to a high diversity of regions and urban nodes, it is impossible to define a single solution for accumulated problems caused by climate change. Differences in natural and geographic conditions, various levels of economic and technological development, sensitive social contexts, as well as an increasing number of vulnerable population, certainly demand a flexible and comprehensive approach, well adjusted to local uniqueness. However, some of the already applied actions

and initiatives have a capacity to be globally transferred without significant modifications because they offer universal topics, ideas, concepts and guidelines on various levels. Simultaneously, they deal with different aspects that do not have to be mutually integrated or even connected in order to work.

Searching for relevant experiences that could help Serbia in the development of its own approach to eco-sensitive urban development led us to the case study approach – starting from results and working back towards the local situation and theoretical foundations. Circumstances in Serbia are such that the global warming problem, together with the need to build in an eco-sensitive manner, is simply not very high up in the agenda of current political, economic or culturally based activities. Therefore, the selected cases (i.e. possible role models) have to:

- provide an 'idealized'/universal model for limited/small-scale intervention;
- incorporate most of the latest eco-city requirements and imperatives;
- give us a well-defined idea(s) of expectations, goals and themes to consider and values to follow;
- suggest clear-cut solutions that might be applicable to the context of urban development in Serbia;
- represent well known examples, acknowledged in the scientific community.

According to these criteria, the development projects of Sarriguren and Jätkäsaari are underlined and analyzed, emphasizing their general aspiration in forwarding new visions, fresh approaches and innovative concepts in the design of cities for sustainable development. Furthermore, both projects were a result of more or less open competitions, where the characters of institutions that initiated and monitored the process seem to have defined, in an important degree, the scope, character and expected impact of each proposal. With flagship pretensions, these and similar initiatives enter a field that can be seen as just another utopia if understood holistically (as a packaged project), but moreover as a possibility of piecemeal engineering if dissected and broken down to various layers of aspects, concepts and solutions to be used in somewhat different circumstances existing elsewhere. The differences between two cases are also important – providing the major tools which enable us to understand them and further evaluate experiences they offer as contribution to the comprehensive design of a sustainable built environment.

BETWEEN ACTION AND ATTRACTION: SARRIGUREN - PAMPLONA, SPAIN

Representing the first eco-city in Spain, the city of Sarriguren was an initiative of the Department of Housing and Planning of the Government of Navarra. Backed and financially stimulated by the government, the city was designed in 1998 and completely realized in 2007, providing a new environment for 5000 bioclimatic dwellings for social housing, the Innovation Park of Navarra and various urban programs. Responding to the challenges of climate change and following the required principles of environmental sustainability this project was internationally recognized as an excellent example of eco-efforts, with the distinction of 'Good Practice' by the United Nations Center for Human Settlements in 2000 and the 7th European Urban and Regional Planning Award in 2008 (category of Environmental Sustainability).

The concept

Positioned on the outskirts of Navarra's capital Pamplona, at the north-east end of the so-called 'innovation corridor', Sarriguren represents a new node of creativity, innovation and research. It reflects elements of the regional development strategy which has transformed the region of Navarra into a highly dynamic socio-economic environment and one of the wealthiest regions in Spain and the European Union. The region has focused on new technologies, renewable energy production and environmental stability, planning to increase its connectivity to Madrid and Barcelona by high-speed trains.

According to the competition conditions for the design of the Eco-city Sarriguren, the invited architectural firms from Spain were expected to create a proposal(s) that would provide high-quality housing and public areas, simultaneously integrating the city and surrounding landscapes. The innovativeness, social accessibility and affordability of solutions were emphasized, as well as a bioclimatic approach in architecture and urban design. The selected project was designed by the Studio Taller de Ideas with the Fundación Metrópoli as a knowledge partner. The public company Navarra de Suelo Residencial S. A. (NASURSA) and the development company CRANA were in charge for management and implementation, while the Government of Navarra was actively involved in the process of implementation through a number of financial incentives oriented towards potential developers.

Focusing on major urban features – which should be sustainable, integrated, well connected and diverse – the list of design criteria stressed the

importance of clean technologies, new management, shared mobility and interaction with natural environment. The application of bioclimatic architecture and urban design was encouraged, while the imperatives of social cohesion and civic leadership were considered as a pre-condition for the gradual changes of urban life-style and full implementation of the project. As a result, the architectural and urban design of Sarriguren, which is adjusted to the local environmental conditions, includes passive and active solar systems, natural ventilation, low-impact construction, insulation and thermal inertia, centralized systems and photovoltaic technology (Vegara et al., 2009).

The knowledge partnership under the EU Pro.motion project has additionally directed sustainable transportation initiatives in Sarriguren, underlying the interaction between transportation, land use and environmental protection.

The outcome

Based on the mixture of so-called blue and green networks, the 'ecological' design of Sarriguren is a combination of new (and diverse) architecture and public spaces, the inherited identity of the preserved historic village and recognizable landscapes and vegetation. The special feature of the eco-city (and the entire urban region) represents the Arga River and its valley, as one of important strategic corridors dedicated to recreational and leisure activities.

The residential areas were designed according to the main eco-standards and criteria, simultaneously respecting the imperatives of affordability, without loss of quality. The architectural diversity was achieved through a proposed typology related to five spatial entities (The Ecocity Gates, Ecocity Condominiums, Parkview, Ecocity Single Family Dwellings and El Pueblo) which contain low, medium and high-rise apartments, single-family dwellings and houses in the historic village.

The importance of the knowledge sector and of creative economy definitely reflects on the design of Sarriguren. Therefore, the project includes several types of innovation spaces – such as an innovation and production park and 'Cubes of Innovation'. Based on the principles of flexible architecture, 'Cubes of Innovation' could be used as independent units or grouped together for research, urban services and commercial and business activities. The innovation park represents a research and enterprise node dedicated to alternative energy development and environmentally friendly technologies, but it also contains other activities – housing, leisure and learning.

The building of the National Renewable Energy Center (CENER), which received two prizes in

2005², is an exceptional example of the eco-principles applied in Sarriguren. The building uses a photovoltaic façade paneling, green roof, solar energy, thermal inertia and cross ventilation in order to provide a space appropriate for research, development and promotion of renewable energies.

The follow up

Key words for this project, based on a 'top to bottom' approach, would be housing and ecology (hence, the scale of the program, involving a complete settlement of 5000 dwellings of socially affordable housing, office space and all other standard amenities). It is also important to notice that the solutions offered in the eco-city of Sarriguren were conceived in 1998, far away from the current understanding of global warming and the importance of controlling carbon emissions. However, the project has demonstrated the capacity to meet new challenges by addressing primarily the issues of environmental stability and renewable energy through a bioclimatic focus of urban design and architecture.

The viability of the Sarriguren project and recognition it gained proved that it was conceived with development in mind, with experiences transferable to other residential developments, but not to the inner city structures (Ah asociados architecture office, 2011). Furthermore, the pilot program, which implemented a Sustainable Energy Assessment, confirmed a significant reduction of energy consumption of residential buildings in Sarriguren – a 51.85% improvement over existing standards, instead of a required 25% improvement over the current energy efficiency norms per building.

Obviously, the results of the assessment have a two-fold role in the promotion of attractiveness and competitiveness of the eco-city – verifying both ecological and economic sustainability, which are essential for potential investors and buyers, but also project developers.

TOWARDS AN ECO-TOPIA: JÄTKÄSAARI – HELSINKI, FINLAND

Initiated in 2008 by SITRA³ and its Energy Program, the project of building a new carbon neutral urban district in Jätkäsaari introduced a

² The CONSTRUMAT Prize and the award for the Sustainable Building 2005 at the International Conference GBC in Tokyo.

³ SITRA – The Finnish Innovation Fund was founded in 1967. Since 1991 it has been working under the auspices of the Finnish Parliament being an independent actor. Focusing on sustainable development and people, SITRA promotes stable and balanced development in Finland, as well as the growth of the national economy and international competitiveness and co-operation. More about its activities at <http://www.sitra.fi/en/>

new vision of the comprehensive redevelopment process of former docklands in Helsinki. Elaborated by the Strategic Design team and backed by the municipality of Helsinki, the project aimed to raise the interest of city decision-makers, developers, planners and constructors for solving problems they will be facing in view of adopted policies in carbon emissions.

Searching for the best team(s) and framework which should enable a sustainable carbon-free future for the selected district, SITRA launched the Low2No Sustainable Development Design Competition in 2009. There were four main objectives – low/no carbon emissions, energy efficiency, high architectural/spatial/social value and application of sustainable materials and methods.⁴ The participants were invited to design a strategy, to define an indicator of sustainability and to create a vision, which should facilitate application and evaluation of the development process.

The project also aimed at global recognition of globally inspired and globally applicable ideas and solutions that, on the other hand, incorporated local qualities of Jätkäsaari and Helsinki – making them even more attractive on the world stage.

The concept

The winning entry '*C_Life: City as a Living Factory of Ecology*' (by Arup - Sauerbruch Hutton - Experientia - Galley Eco Capital) combines seven key elements related to ecological, social, technological and economic aspects of human behaviour and community development. Considering the predicted structure of future users/inhabitants – ranging from young professionals to families and retirees, the winning proposal also suggested fifty ideas to achieve desired eco-behaviour and consequently reduce carbon emissions. Targeting different problems related to energy, transport, food and consumer goods, as well as their impact on the built environment, these ideas vary in scale and complexity. Accordingly, they are classified into four categories dealing with engagement and awareness, community actions, self-assessment and positive reinforcement and cultural leadership. The impact of this project should be significant – the estimated onsite carbon reduction should reach 37% in 2012 and 43% in 2037, while an offsite wind farm should enable a carbon negative future of the district by 2021.

The area, which is a continuation of the city centre, is surrounded by the Central Park (W), a boulevard (N), an alley (E) and a lane (S).

⁴ More competition details could be found at <http://www.low2no.org/pages/competition>

According to the proposal, it consists of five urban blocks with private gardens in their centre. The buildings are seven to eight storeys high, except the buildings on the East side which are limited to three storeys due to sunlight requirements. The urban and architectural design is guided by several principles generated from the overall concept and specific conditions of local climate – from maximising daylight, to the creation of semi-public spaces, mixed activities and combined programs. The winning project also proposes two types of C_Life houses, as the basic module(s) which could be varied and adjusted to different contexts, and two buildings – the SITRA headquarters and the C_Life Community Centre.

Special attention was given to the principles related to landscape and its forest layer, fruit/vegetable/herb layer and grassland scrub layer. The first one should influence the appearance and activities mostly on the ground level (public and semi-private atriums, public spaces, residential play spaces, private recreational areas, streets and the edge of the site/park). The second one should be included into southern facades of residential towers and balconies, while the grassland scrub layer was proposed for the 'green' rooftops.

The question of transport and movement required an approach which is synchronized with the official master plan and adjusted to the already developed mobility management of Jätkäsaari. In order to improve mobility and movement in and around the C_Life district a new strategy was created, underlining the importance of imperatives related to live/work concept, connectivity, new electric vehicle plan, bio-fuels and a 'low-carbon' infrastructure and policies (ARUP, 2009).

The energy strategy covered societal, economic, environmental & technical and leadership issues, also proposing near/off-site energy systems and several development scenarios. The sustainability of materials and structures was also positioned within the low/no carbon framework, as well as the impact of food production/distribution on carbon footprint.

The C_life offered a list of performance indicators, covering several categories – overall measures, carbon emissions, energy, transport, quality of life and equity, and introduced new ideas for a systemic change which would include founding of the Finland green building council, the development of climate-benefiting finances and clean-tech corridor.

The outcome

The preparations of the site for the Airut⁵ block,

which is the result of the Low2No competition and a part of the C_Life concept, started in 2011. It was announced that the block should be ready by summer 2013, but some of the buildings from the eco-Jätkäsaari district are already under construction. The project of the multi-storey timber building for the SITRA headquarter (by Sauerbruch-Hutton, Arup and Experientia) has won the Holcim acknowledgment award for sustainable construction in 2011.

In the meantime, Finnish entrepreneurs, together with urban enthusiasts, work on different projects and ideas which should introduce and develop innovative business and service models for the sustainable Airut block and similar initiatives which would utilise the Low2No vision. The event organized in September 2011 presented five interesting solutions which tackled the issues of urban food production, life-style and fashion based on recycling and sharing, international exchange of innovative low-carbon experiences and a new kind of a specific eco-entrepreneurship.

The follow up

Key words for the C_life project would be energy, global warming and carbon emission, the urban context being only a framework in which solutions can be demonstrated. Although a small-scale project, Jätkäsaari has large-scale ambitions concerning its impact and indirect influence in matters of carbon emission. Its bottom-up and top-down approach should correlate legislation, socio-economic structure and information infrastructure providing an efficient self-sustainable setting which requires no extra funding and is concentrated on changing the attitude of participants. Comprehensive, flexible, interdisciplinary and essentially open-ended, this project was meant to initiate ideas and suggest solutions that are applicable in a diverse set of other circumstances, thus offering a manual for solving problems of carbon emission in (any) urban environment, or even any built environment.

Consequently, it seems that the basic contribution of this project could be found in the suggested methods of addressing the carbon emission problem – introducing an exceptionally diverse and still interconnected system of activities into the built environment and demonstrating their potentials and effects. Strong reliance on offsite support and important changes in financial frameworks are only reminders that sustainable development and even small-scale progress towards a low carbon emission can give important results only through the support of wider, sometimes even global networks.

However, the real onsite and offsite impacts still

cannot be measured and verified by the local community and experts because the realization of C_life has just begun.

GLOBAL APPLICABILITY AND THE CHALLENGES OF SERBIAN REALITY

The projects of Sarriguren and Jätkäsaari rely on a developed national and local community, can count on the existence and further development of a solid social capital, and rely on an important surplus of good will and incentive that has been developed during a number of years of new 'bell epoch' life Europe has been living. Contrary to this, Serbia is burdened by two essential shortcomings – it is basically poor in most aspects of measurable development, and its (un)development is unevenly distributed from north to south.⁶ To transform these weaknesses into chances is short of an act of magic, especially considering effects of the global crisis that still have to be met. However, it is possible to imagine that investment in an underdeveloped environment (Serbia) could lead to greater profit, and that investing (money, time, know-how and un-renewable prime urban land) in the most developed part of Serbia (i.e. the Belgrade metropolitan region) could have a beacon or pathfinder effect, offering innovative projects in places that can make them happen.

In the case of Serbia, these projects should have a direct economic effects, rely as little as possible on the central government while the emphasis should be placed on local factors (citizens, municipality, business, academic community) and, of course, the international community. The eco-driven projects should be flexible in matters of scale (a complex interconnected set of small-scale projects) and be able to grow. Consequently, growth would gradually incorporate various layers of incentives supported by a developing social capital, existing and future technologies, governance solutions and outside (international) backup and investment, becoming a site for learning by doing. The effects of these actions would not be immediate, but a new path for an improved perception of the living environment could be traced, its problems and challenges acknowledged and actively included into new eco/low-carbon strategies and policies.

Serbia cannot be expected, either at the local level nor the level of state initiated actions, to directly implement solutions that have been developed of initiated elsewhere. It must develop its own approach, and the first real step would be to come

⁶ Serbia has declared its Strategy of Regional Development of the Republic of Serbia for the period of 2007 to 2012 (2005), where indicators of development and extreme differences in level of development of different regions are well illustrated.

⁵ Airut – 'forerunner' and 'messenger' in Finnish

out of the 'paper' phase into a real time/space project, a pilot or potentially even a flagship project of its own. This was, in essence, the main motive in choosing potential useful experiences occurring worldwide during the last decade.

In this paper, we looked for projects that could initiate change by example or by illustration, projects that could be used as role models for a similar project to be developed in Serbia. It is, of course, understood that experiences offered by Sarriguren and Jätkäsaari or other similar projects are applicable to ambitious local communities with adequate potential in economic, social and land resources with adequate administrative capacities. Nevertheless, existing potentials and circumstances of public awareness in Serbia point to Belgrade, as the most developed region and the most probable starting point of such an endeavour.

Specifically, we are talking about the development of two waterfront locations in former industrial zones located in the center of Belgrade. The first one is positioned along the river Sava (about 2000 meters on the right and left bank, covering approximately 160 ha) and embedded between the traditional city center and New Belgrade. The second one, along the river Danube and in the vicinity of the historic center, covers around 48 ha and about 6000 meters on the right riverbank. The Danube development is, at the same time, part of Europe's corridor VII, that should give a boost to the projects and make them internationally visible.

Many studies concerning the future development of these locations have been made⁷ stressing factors of technology, functionality, economy, land use and architecture. Unfortunately, none of them have, up to this moment, considered the idea of developing or identifying them as an explicit eco-city or a sustainable city showroom demonstrations of urban development which is certainly an opportunity that must not be left unexplored, especially in contexts of the latest eco-driven development trends.

A real life experience and learning by doing are not often practiced in Serbia, but should prove to be beneficial if only sufficient political courage exists. Therefore, the presented case studies and their multi-leveled applicability could provide a necessary theoretical and practical impetus for this kind of action, while their global recognition, success and universality could serve as a signpost and motivation for our local authorities in their search for a necessary international networking and funding which should support urban and eco/low-carbon development in Serbia.

⁷ Details related to this area and its development could be found in the Master Plan of Belgrade 2012 (2003), the Revision of the Master plan (2006) and INFO 16 (2006)

CONCLUSION

The cases of Sarriguren and Jätkäsaari certainly provide a set of useful ideas and prescriptions which could be adapted and embedded in the strategies and concepts of low-no carbon practice in different contexts. Although Serbian reality does not provide a perfect setting for the total application of these concepts, it does not mean that foreign knowledge and expertise cannot be transposed to another level and/or included in a local framework. By focusing on these examples in a separate and selective manner, we are certain to lose some of their synergetic effects but it would mean making a step in the right direction. In the end, a series of steps will achieve better results than the classical 'package' of reforms and amendments we might not be ready to implement.

In terms of possible implementation, or direct use of experiences offered by these and similar projects, basic problems center on various shortcomings in the present political, social and economic infrastructure in Serbia (Lazarević-Bajec, 2011). A prolonged crisis will, inevitably, postpone important issues, and the only way to include them would be to render them as effortless as possible for the existing administration, close to everyday interests of all participants, and independent of any major government financial intervention. This is something that can be done only through small independent projects and horizontal connections among willing participants. Top to bottom actions would be welcome but cannot be counted upon.

Obviously, the adjustment to the challenges imposed by climate changes has to be a very dynamic, interactive and innovative process in order to meet the global deadlines and achieve the high aims of sustainability, energy efficiency and a low/no carbon future. However, in spite of the raising uncertainty an effort has to be made – as a step towards a 'green' vision, a necessity for a healthier environment or a legacy for the generations to come.

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