How to Build a Smart Climate City Conserving and Using Biodiversity

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Abstract. Urbanization requires many challenges. It is placing environmental load on natural resources because cities account for 60–80% of energy consumption across the globe and for more than 70% of worldwide carbon dioxide emissions. As a result, to ensure better living conditions for present and future generations, cities need to adopt the smart route and at the same time focus on the sustainability aspect. Cities need to be both sustainable and smart. The sustainability aspect is not just in terms of environment but also economic, social, and governance. The three pillars of sustainable economic advancement, political involvement, and social emancipation are the fundaments for a smart sustainable city. The management of green areas, and the restoration of ecosystems and biodiversity conservation allow cities to address the concerns of all three objectives: climate change, biodiversity, and land management (avoiding desertification). Innovation and digital technology must be oriented to minimize energy consumption and improve quality of life. Therefore, digital technology and information and communications technology need to address urbanization challenges and ensure sustainability.

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Keywords. smart, urbanization, conserving, biodiversity, sustainability

Introduction

Cities need to be sustainable and to offer certain standards of quality of life and opportunity that make people want to live in them and organize their activities. Urbanization requires economic development and the delivery of many public services, such as education, healthcare, and transportation; but the process is associated with environmental degradation, biodiversity loss, pollution and congestion, and economic and social exclusion.

We need a global effort and interest to ensure a future of healthy, attractive, and vibrant towns and cities for future generations. To realize these common objectives, we need attractive areas to live, work, and relax in. The migration of population from rural to urban is increasing. People choose to live in urban areas and have a better quality of life. 75% of Europeans live in cities and urban areas, and by 2020 this is expected to rise to 80% (EC Report). The causes are more job opportunities and other social and economic advantages.

Therefore, we can say that biodiversity makes our cities green and pleasant places. Nevertheless, biodiversity is affected by urban development. Urban areas can mitigate and adapt to climate change by using solutions provided by nature and biodiversity, such as green roofs and walls or biodiversity-rich parks or gardens. All major developments are expected to utilize green roofs as a technique for climate change mitigation. Green roofs offer many public, private, and design-based benefits: through the daily dew and evaporation cycle, plants on vertical and horizontal surfaces are able to cool cities during hot summer months and reduce the Urban Heat Island (UHI) effect; the light absorbed by vegetation could be converted into heat energy. It can also reduce the distribution of dust and particulate matter throughout the city, as well as the production of smog; reducing greenhouse gas emissions and adapting urban areas to a future climate with warmer summers. Visual and environmental diversity can have positive
impacts on community and psychological well-being, as well as many other benefits.

At present, the biodiversity is delicate and frequently threatened by urban development. If managed correctly and smartly, urbanization can contribute to biodiversity conservation through spatial planning at city level. For example, the EU launched a process of developing a strategy on green infrastructure to protect biodiversity and ecosystem services. The strategy will embrace both the Natura 2000 network and the four-fifths of the EU territory that falls outside it (European Commission Directorate-General for the Environment Information Centre [BU-9 0/11], 2010).

**Material and Methods**

This paper proposes to find ways to support citizens and local governments in their efforts to make our cities and towns clean and healthy, green and pleasant, efficient, well managed, and sustainable. We need policies and measures in support of a quality urban environment for citizens, to keep our urban environments clean, green, and healthy. Some of the key policies and initiatives aimed at decoupling economic and social development from consumption of resources are:

**Natural resources:** For efficiently function and to lower use of natural resources, it is vitally important for our cities to achieve a sustainable quality of life for world citizens, now and into the future. It is vital to adopt a number of key policies and initiatives aimed at decoupling economic and social development from consumption of resources. Cities requires a wide range of resources, from energy and water to minerals and metals. The EU’s Thematic Strategy on the Sustainable use of Natural Resources highlights the danger of using natural resources at a rate that exceeds their regeneration capacity (EU, 2005).

This strategy requires Member States to draw up waste prevention programs. Cities need to have the opportunity to manage the use of resources better, use them efficiently, and cut down on waste and pollution. Some studies have found that per capita consumption of resources such as energy tends to be lower in urban areas, because of efficiencies achievable in areas with higher population densities. However, there are considerable differences between cities in terms of performance.

**Energy:** One of the important component in the effort to achieve efficient and sustainable global cities is development of green buildings that require less energy for lighting, heating, and cooling through clever use of glass and innovative airflow systems. The EU promotes green buildings through several measures including the Energy Performance of Buildings Directive (2010/31/EC), which sets minimum standards requiring Member States to make new and existing buildings more energy efficient. The EU is also working on reducing our dependency on fossil fuels by increasing the amount of energy that comes from renewable sources. The Renewable Energy Directive (2009/28/EC) requires 20% of energy across the EU to come from renewable sources by 2020.

**Transport:** To improve the citizens’ quality of life and create economic development, efficient urban transport is fundamental. At the moment, the internal combustion engine is a major source of air and noise pollution and negative impacts on health and the environment. The EU is also promoting the use of electric and hybrid cars through the European Green Cars Initiative, launched in 2009.

In Valahia University of Targoviste, Romania, there are important initiatives in this area based on the experience to develop a Competitive Pol at regional level, for electric cars building, in partnership with Renault Technologies Company, resulting in important research and education. The university sustain a research center for electric vehicles (eMotion) and a Master’s program—Integrated Electrical Systems Engineering in Vehicles.

**Climate change:** The long-term sustainability goals is the reduction of the climate change effect. “The European Commission supports cities in reducing carbon emissions through initiatives such as the Covenant of Mayors.”
More than 1,900 cities across Europe have committed to go beyond the EU emission reduction targets of a 20% cut in CO₂ emissions by 2020—through the development and implementation of Sustainable Energy Action Plans” (European Commission Directorate-General for the Environment Information Centre [BU-9 0/11], 2010).

One of the conditions is the exchange and application of good practices to improve energy efficiency and promote low-carbon business and economic development. There are measures to identify emissions reduction opportunities—including better energy efficiency in buildings and green mobility. The European Commission’s White Paper on adapting to climate change noted that urban areas would face particular problems. The Commission is supporting actions such as the GRaBS project and BaltCICA (Climate Change: Impacts, Costs, and Adaptation in the Baltic Sea Region), which assesses flood risks and sea level rises in the Baltic Sea area with its many coastal cities (European Commission Directorate-General for the Environment Information Centre [BU-9 0/11], 2010).

**Sustainable urban development**: One of the tools for sustainable cities development is the implementation of an Integrated Environmental Management System (IEMS). A good elaboration of IEMS helps avoid conflicts by considering the competing demands between various policy areas and initiatives (economic well-being, competitiveness, health, environment, spatial planning), and by setting long-term goals.

In addition, we need to promote eco-innovation, and energy and resource efficiency, to encourage the cities to use the most environmentally friendly products and services, to achieve more sustainable consumption and production, and higher environmental standards.

One of the instruments can be involving citizens in urban planning and playing a vital role in providing well-planned cities. Because citizens are affected by urban planning, authorities need to ensure that they are involved and provided with a forum for expressing their opinions.
Results and Discussions

Each city has unique particularity and identity: cultural, historical, economical, etc. As well as a multitude of options for business, employment, healthcare, leisure, and education (Ratan, 2015). Of course, cities attract people from rural regions seeking opportunities for employment, education, and a better lifestyle—migration process.

Each city is unique, with a unique economic shape, environmental, and social context, and will have to determine a unique path to becoming smart and sustainable. Sustainability requires engagement and makes a balance between smart cities components and sustainable cities components (Figure 1).

Future studies need to concentrate on the relationship between biodiversity conservation, urban planning, smart cities, natural resources, and ecological changes, rather the present approach. Detailed studies of natural resources distribution in some areas of the cities, or inner of cities, are necessary as a first step, to generate an equilibrium between environmental components and human health.

Conclusions

Cities needs to be both sustainable and smart. The sustainability aspect is not just in terms of environment but also economic, social, and governance. The three pillars of sustainable economic advancement, political involvement, and social emancipation are the fundamentals for a smart sustainable city.

Using specialists in biodiversity conservation, architects, and elaborating good practices in smart cities, policy will help government authorities, decision-makers, city planners, consultants, entrepreneurs, and investors to view smart cities through the sustainability perspective and work together.

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